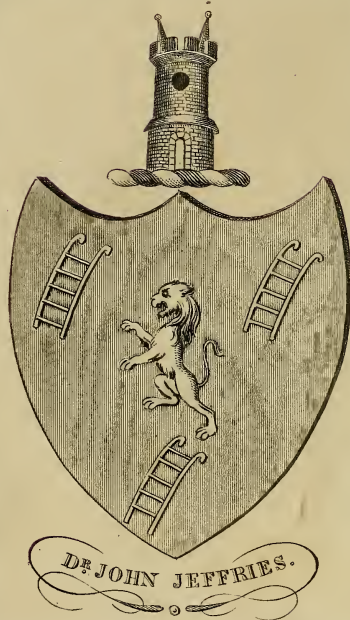


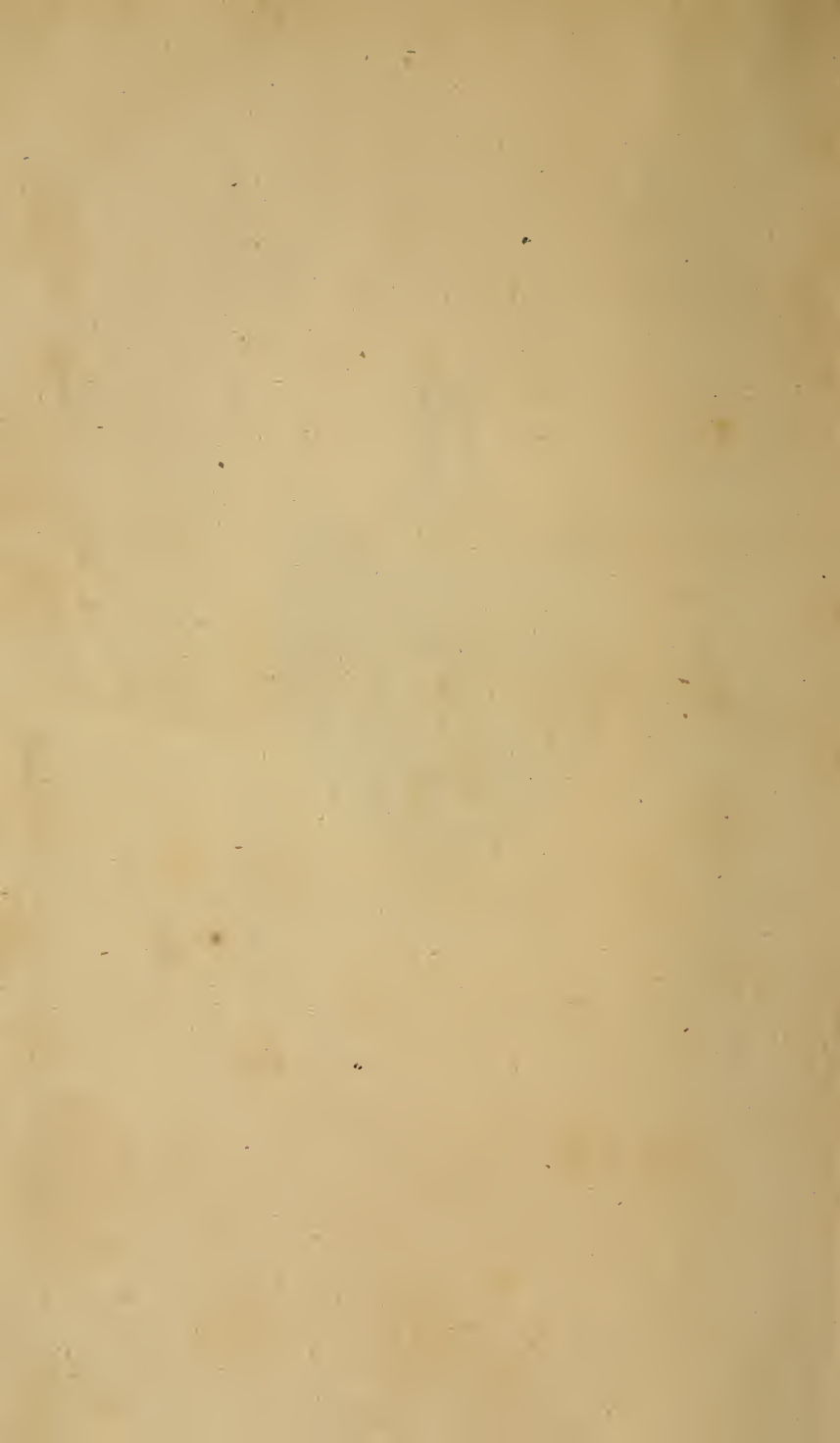
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OBSERVATIONS  
ON  
CRURAL HERNIA:

TO WHICH IS PREFIXED,  
A GENERAL ACCOUNT  
OF THE OTHER  
*VARIETIES OF HERNIA:*

ILLUSTRATED BY ENGRAVINGS.

BY  
ALEXANDER MONRO, JUN.

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1803.

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TO

DR JAMES CARMICHAEL SMYTH,

PHYSICIAN EXTRAORDINARY TO THE KING,

AND TO

DR RUTHERFORD,

PROFESSOR OF BOTANY IN THE UNIVERSITY

OF EDINBURGH,

THE FOLLOWING PAGES ARE INSCRIBED,

AS A TESTIMONY OF THE REGARD

AND ESTEEM OF

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## ADVERTISEMENT.

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*Since these Observations were read to the Royal Society of Edinburgh, Mr Hey of Leeds, a gentleman of great experience and eminence in his profession, has published various excellent Observations on Crural Hernia, from which the Author has made Extracts, in order to render his History of Crural Hernia more perfect.*

*With the same view, an Extract from Dr Monro's Treatise on the Bursae Mucosae is also annexed, in the form of an Appendix.*



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# GENERAL OBSERVATIONS

ON

## HERNIA\*.

---

THE frequency of hernia, the occasional obscurity of its commencement, together with its fatal consequences, give this disease a strong claim to the attention of all who practise the healing art.

No rank nor condition of life gives perfect security from the attacks of this disease. The old and the young, the laborious and the idle, the corpulent and the lean, the rich and the poor, are subject to it.

A

But

\* The following observations on the different species of hernia were read before the Royal Society of Edinburgh, April 19. 1802.

But though all are liable to this disease, they are not equally so ; the difference of age, sex, habit of body, and condition of life, not only give a greater or a less disposition to hernia in general, but have an influence in occasioning the particular species of the disease.

Amongst the various ranks of society, the lower classes, owing to their continued labour, are most subject to hernia : and the disease proves more certainly fatal to this description of people, as labour not only induces the complaint, but tends to increase it when formed, and poverty too often prevents their obtaining the only means capable of arresting its progress.

The frequent occurrence of the disease, and the number of useful persons disabled, or lost to the community, gave rise to a charitable institution in London ; the object of which is, to afford relief to the ruptured poor.

The records of this society afford, to a certain degree, the means of making an estimate of the proportion of persons afflicted with hernia.

Mr Turnbull, surgeon to that institution,  
states

states the average as 1 to 15. “ Few men (he  
 “ observes) have taken more pains to ascertain  
 “ this peculiar point than myself; and, after the  
 “ most diligent and general inquiries through-  
 “ out the kingdom, I am induced to take them,  
 “ male and female, and of all ages, upon an  
 “ average of 1 to 15.” This proportion may be  
 thought by some too high; but we find the truth  
 of it supported by the concurring testimonies of  
 foreign authors \*.

As no full and accurate treatise has, as far as  
 I know, been professedly written on crural her-  
 nia, I have directed my attention chiefly to that  
 species of the disorder.

On account of the intimate relation which  
 subsists between a minute knowledge of ana-  
 tomy, and the pathological history of crural her-  
 nia, an anatomical description of the parts con-  
 cerned in this disease, in both sexes, seems to be  
 a necessary introduction to the subsequent his-

A ij

tory

\* Gimbernat and Arnaud,

tory of the complaint, as it will tend to point out not only the situation of the tumour, the effects of the protrusion on the crural arch, and the cause of the greater frequency of this complaint in the female, but also suggests the safest and surest method of removing the disease by pressure, or by a surgical operation, and also the means of preventing a return of it.

I was naturally led to this inquiry, from some opportunities, that have occurred to me, of examining the nature of this complaint in the recent subject, and from having the advantage of several preparations in my father's museum, illustrative of this kind of hernia: and also from my being able to subjoin some accurate drawings made, at my request, by that able draughtsman and anatomist, Mr Fyfe.

But, before entering upon the immediate object of my inquiry, it may not be improper to premise a short account of hernia in general; as, by comparing the various forms of this disease, the peculiarities of crural hernia will be more obvious.

OF THE NATURE AND VARIOUS FORMS OF  
HERNIA.

By the word Hernia is generally understood, in the language of surgery, an external tumour, formed by a protrusion of the bowels through one or other of the openings through the abdominal muscles, where the umbilical, spermatic, or crural \* vessels pass out, or round ligament of the female uterus.

The sac of the tumour is formed by the peritoneum, and, within it, are contained an aqueous fluid, the omentum, a portion of the alimentary canal, or other viscera of the abdomen.

Different names have been applied to the various species of hernia, descriptive of the age of the subject afflicted by the disease, or of the situation of the tumour: hence the term her-

A iij nia

\* The term *crural* is meant to include the femoral, sciatic, and obturator blood-vessels, as all of these are spent on the upper part of the thigh.



nia congenita, as it appears at or soon after birth.

Exomphalos, or umbilical hernia:

Bubonocoele, or inguinal hernia.

Hernia Scrotalis.

Merocele, or crural hernia.

Ifchiatocele, where bowels protrude through the ischiatic notch of the os innominatum.

Ovularis obturatoria, where bowels protrude through the oval aperture in the ligamentum thyroideum, along with the obturator blood-vessels.

Hernia perinei, where tumour appears at the perineum.

Another distinction of herniae is mentioned by surgical authors, arising from the different contents of the hernial tumour.

Enterocoele, where the intestines are protruded.

Epiplocele, where the omentum is protruded.

Entero-epiplocele, where the omentum and a portion of the intestine, are contained within the same tumour.

Cystocoele,

Cystocele, where the bladder of urine is protruded.

Hysterocele, where the uterus is protruded.

Hepatocele, where the liver is protruded.

And, Splenocele, where the spleen is protruded.

Besides the above species of herniae, where the bowels are protruded through what are called natural openings in the abdominal muscles, there are other examples of herniae, in which the bowels have been forced through some other of the parietes of the abdomen, which have been called Ventral Herniae.

Ventral herniae are generally situated in the middle, or at the side of the linea alba, or linea femilunaris. The tumour is of various sizes : in some instances, it is very large, and contains within it a portion of the stomach. In other instances, there are two or more small tumours at the side of the linea alba, or femilunaris, which disappear on pressure, as the diameter of the base of the tumour is equal to that of any other part of it.

Sabatier describes another very rare ventral hernia in these words: “*Quequefois aussi elles (boyeaux) se déplacent par un écartement des fibres de ce muscle près l’anneau.*”

Another extraordinary form of ventral hernia, and which may be looked upon as a *lufus naturae*, occurred to my father. He was consulted, along with Dr Farquharson, respecting the nature of two tumours, which were covered by the skin alone, on each side of the back of a child, six months old, immediately under the false ribs.

Each tumour, upon an accurate examination, was found to contain a kidney, which could readily be reduced through an oval ring, of a considerable size.

#### OF INTERNAL PROTRUSIONS OF THE BOWELS, IMPROPERLY CALLED HERNIAE.

BESIDES the external protrusions of the bowels, which constitute the different forms of herniae,  
above

above enumerated, there are also instances of internal protrusions, which, though not coming under the general definition of hernia, yet, from their analogy to this disease, deserve to be taken notice of, when treating of this subject.

A part of the intestine, generally a part of the great arch of the colon, has been observed to pass through an aperture in the diaphragm.

This unnatural appearance was probably the consequence of original malconformation, as the sides of the aperture were found perfectly smooth, which could not have been the case, had it been the consequence of rupture, from violent muscular exertion. Such apertures have been discovered in persons of different ages, who generally died in consequence of strangulation of that part of the colon, which passed through the diaphragm, or in consequence of the displaced bowel impeding the free action of the heart and lungs.

Such a *lufus naturæ* in the diaphragm was sent to my father, by Dr Paterfon, with a letter  
(dated

(dated Ayr, 1793,) giving the subsequent history of the case.

A young woman, of 22 years of age, had been occasionally subject, during the greater part of her life, to pain in the left side, under the false ribs. This was generally succeeded by pains throughout the whole belly, resembling colick pains; and was attended with some degree of costiveness. These complaints commonly wore off in a few days, and she was most subject to them at the period of menstruation. Having danced violently on a Saturday evening, she was seized on the Sunday morning, in the manner above described. In the afternoon, she was seized with a violent vomiting, and with excruciating pains in the side, and belly, which lasted during the whole night. An injection was given about 10 o'clock, which procured a considerable discharge of faeces, but without any relief. She continued drinking large quantities of water-gruel, and throwing it up almost immediately, till about 10 o'clock next forenoon, when she expired.

She



She was never observed to have any shortness or difficulty in breathing, and lay alike well on both sides. The body was opened the following morning, and, although only 22 hours after death, it was unusually putrid. The bowels were much distended with air, and the drink she had swallowed, was effused into the cavity of the abdomen. This I found to arise from an opening through the coats of the stomach, nearly in the middle of its great curvature. On examining the intestines, I found that a large portion of the colon had passed through an opening in the middle of the left side of the diaphragm, into the cavity of the thorax; and lay behind the heart and lungs.

This tumour exceeded the size of a person's fist, and appeared to be strangulated, for all the blood-vessels were turgid, as if they had been injected, and the gut was with difficulty drawn back into the cavity of the abdomen. On examining the opening through the diaphragm, I found it surrounded by a callous ring, and to have every appearance of having been of long standing,

standing, or more probably an original defect. A thin pellucid membrane was connected with part of the edge of the ring, and a sort of process from this membrane, extended along the tumour into the cavity of the thorax.

From the symptoms which preceded the death of this woman, and from the history of the appearances discovered upon dissection, it appears to me, that the violent exercise she had taken, forced, through the praeternatural aperture in the diaphragm, more of the colon, which brought on strangulation.

The aperture is of an oval shape, and, though considerably shrunk, from having been dried, still measures two inches and a half in length, and one inch and a half in breadth.

A singular instance of internal protrusion, undescribed by any author, occurred to my very learned colleague, Dr Rutherford. In this instance, there is a praeternatural aperture in the mesentery, through which a portion of the ileum had protruded, and was strangulated; the bowels being twisted in a very extraordinary

nary

nary manner \*. The patient, a female, died in consequence of inflammation in her bowels. The portion of the ileum, which passed through the mesentery, was found strangulated †.

Another variety of internal hernia is produced, in consequence of the villous and cellular coats of the intestines being forced through the muscular coats, in the same manner as pouches are formed in the bladder of urine. In my father's museum, there are two examples of blind sacs communicating with the ileum, and which were probably formed in that manner.

There is still another variety of internal hernia, which is produced by a turn of intestine passing around another portion, and compressing it so much, as to bring on strangulation.

It has been observed, that intestinula caeca sometimes grow out from the intestines. In a remarkable case ‡, one of these passed around a  
portion

\* Vid. Tab. 1. Fig. 1.

† Since the above was written, I found an instance of hernia through the mesocolon, described in the *Act. Nat. Cur.*

‡ Vid. Plate 7th.

portion of the small intestines, and its end was fixed down by a ligament. It so greatly compressed the portion of intestine, around which it passed, as to bring on inflammation and mortification.

#### HERNIA ACUTE OR CHRONIC.

BESIDES the distinction of hernia above stated, there is another, perhaps still more essential, and equally obvious. I mean the distinction of hernia as an acute or chronic disease.

In the former, the disease comes on rapidly, is the immediate result of violent muscular exertion; in many instances creates a very great degree of pain, and, if means are not taken to avert its progress, soon proves fatal, from the strangulation and inflammation of the bowels.

In the latter, the bowels are gradually protruded, without any known previous accident, are easily returned, and remain down without strangulation; and the patient may enjoy a tolerable share of health, by due attention to diet,  
and



and the state of his body. And there are instances of persons, who, though subject to hernia, during the whole of a long life, have not suffered any great degree of inconvenience from it. This may be accounted for from their relaxed habit of body, and the increased size of the ring, which allows the bowels to pass and repass freely through it.

But the disease, even in such habits of body, and under such circumstances, is not entirely free from risk; strangulation being sometime induced, from violent exercise, from the actions of coughing, vomiting, or sneezing, or from indigestion, producing an extraordinary quantity of air within the alimentary canal.

In the acute species of hernia, the stricture of the ring on the protruded bowels seems to be the principal obstacle to the reduction of the tumour; whereas, in the chronic hernia, the thickening of the neck of the sac, which is, in many cases, produced by the pad of the truss being injudiciously applied, and the praeternatural adhesion of some portion of the contents of the  
sac

fac to the fac ; or, what happens very rarely, a contraction in some part of the sac, render it very difficult, nay impossible, to remove the tumour.

#### OF THE CONTENTS OF THE HERNIARY SAC.

FROM the definition we have given of hernia, it is evident that a portion of the moveable bowels generally constitutes the essential part of the tumour ; and the smaller intestines, having the longest mesentery, consequently the most moveable part, are most frequently found within the tumour.

Where a part of the arch of the colon is included in a herniary sac, it carries along with it a part of the omentum. But any other loose part of the intestinal canal, may carry with, or push before it, a part of the omentum, as this is unattached at its lower extremity.

Herniae, therefore, are commonly found to contain, not only a portion of the alimentary canal, but also of the omentum ; more especially



cially in fat or in elderly people: and sometimes the omentum, by adhering to the herniary sac, divides it into two distinct cavities.

In the ventral hernia, even a portion of the stomach may be protruded; in which case, the size of the tumour increases in a remarkable manner, immediately after taking any kind of drink or nourishment.

It may be worth while to make mention of a variety of the contents of a herniary sac, which sometimes, though very rarely, occurs. The history of such a case was communicated by Dr Wardrop to my father, who, after opening the herniary sac of a bubonocoele, found that a portion of intestine was much distended by air, and could not be returned into the cavity of the abdomen.

Upon an accurate examination of this portion of intestine, it was found that there was no communication betwixt it, and the rest of the alimentary canal. It seems probable that, in this instance, the pressure of the ring of the abdominal muscles was so great, as to produce inflammation,

flammation, and adhesion of the opposite sides of that portion of intestine.

He, therefore, cut off this portion of intestine; and no bad consequence followed.

Hence this was undoubtedly an instance of a *lusus naturae* (which is not very unfrequent, as five or six examples of it are preserved in my father's museum), in which a *cul de sac* grows out from the intestine.

Besides a portion of alimentary canal and omentum, herniary tumours are, on many occasions, found to contain a small quantity of a serous or watery fluid, which is probably effused in consequence of the stricture of the ring compressing the veins which pass upwards from the protruded portion of intestine, by which there is a greater push against the exhalant vessels, and a greater secretion of this liquor than usual.

The nature and consistence of this liquor is found to vary, according to the preceding state of the bowels within the herniary sac.

The size of the tumour is also occasionally increased or diminished, from a portion of air contained

tained within the protruded intestine ; a circumstance which is most observable in herniae of a large size, and of long standing,

#### OF THE EFFECTS OF HERNIA UPON THE BOWELS.

IN every instance of hernia, where the bowels cannot be returned into the cavity of the abdomen, one or other of the following consequences may be expected.

In the acute species, or where the protrusion of the bowels is sudden, and accompanied by a considerable degree of pain ; strangulation, ileus, and death, are the usual consequences.

But where the strangulation is not complete, where the inflammation, less violent, does not immediately terminate in ileus and death, it occasions a considerable degree of thickness of the herniary sac, particularly at its neck ; an adhesion of it to the surrounding parts ; and constitutes an incurable form of chronic hernia. This species of the disease, however, is less frequently

the consequence of acute hernia, than of that which comes on in a slow and insensible manner, the protrusion not being accompanied with stricture, or with pain ; and, where the bowels have remained a long time down, without producing any alarming symptom.

In a few hours after strangulation, in many instances, an effusion of coagulable lymph may be observed on the surface of the intestine. The thickness of this varies in different instances \*.

There is probably a similar effusion between the coats of the protruded intestine, as the effusion on the surface cannot sufficiently account for the remarkable increase of the size.

Fig. 2d of plate 5 th, shows a part of the ileum, which had been protruded in a case of crural hernia, adhering to the under portion of the sac that contained it, by means of a layer of coagulable lymph of considerable thickness.

The omentum also often adheres to the neck,  
fide,

\* Vid. Tab. 2d. Fig. 1st shows an instance of such an effusion, in which the layer of coagulable lymph was about the thickness of a piece of gold leaf.



sicle, or under part of the herniary sac. In such a case, the hernia cannot be reduced; nor can pressure be applied in such a manner as to prevent the other bowels from descending into the sac.

The intestines are sometimes of a dark brown or black colour, although no mortification has taken place. This is chiefly owing to the veins of the loose internal cellular coat being gorged with blood, the colour of which shines through the other coats of the bowels; and also to a similar circumstance on the surface of the intestine; in this instance, the blood having been previously pressed out of the vessels, they soon fill again. When mortification has affected the bowels, it renders them so tender and flabby, that, when handled, they tear like a piece of wetted paper\*.

In some cases, mortification is the means by which the patient's life is protracted: For, in some instances of the inguinal hernia, it happens,

B iij

that

\* Vid. Diagnosis, for an account of the other symptoms of mortification of the bowels.

that the protruded portion of intestine is thus cast off; and from the part of intestine above the protruded portion adhering to the ring, the patient drags on a miserable life; the faeces passing through a praeternatural anus, at the ring of the abdominal muscles.

In some cases of scrotal hernia, the pressure of the bowels destroys the testicle, or brings on an induration of the omentum.

#### OF THE NATURE OF THE HERNIARY SAC.

THE herniary sac is formed by the peritoneum, or membrane which lines the abdominal muscles, pushed forwards by the protruded bowels; or, in other words, the herniary sac is formed by a portion of elongated peritoneum.

In a common case of hernia congenita, the process of peritoneum, which afterwards forms the tunica vaginalis, covers the protruded bowels.

In the usual instances of scrotal hernia, the  
 spermatic



spermatic chord and testis are usually placed at the posterior part of the tumour, covered by its original process of peritoneum, the under part of which anatomists call its vaginal coat, and the bowels are placed before it, and contained within another portion of peritoneum, which has been pushed out by the protruded bowels.

In cases of cystocele, the herniary tumour has not the usual sac.

An unusual variety of herniary sac has been described by Mr Hey, of Leeds, which he met with in a child 15 months old \*.

The

\* In the hernia which I am describing, the intestine was protruded after the aperture in the abdomen was closed; and therefore the peritoneum was carried down along with the intestine, and formed the hernial sac. It is evident also, that the hernia must have been produced while the original tunica vaginalis remained in the form of a bag as high as the abdominal ring; on which account that tunic would receive the hernial sac with its included intestine, and permit the sac to come into contact with the testicle. The proper hernial sac, remaining constantly in its prolapsed state, contracted an adhesion to the original process of the peritoneum which surrounded it, except at its inferior extremity: there the external surface of the hernial sac was smooth and shining, as the interior surface of the tunica vaginalis is in its natural state.

From all these circumstances it is evident, that this hernia differed

The sac, especially the neck of it, in cases of chronic herniae, has been found of a considerable thickness, and sometimes evidently consisting of a number of layers, and having a sufficient aperture to let the bowels pass and repass, without risk of strangulation.

In other cases, the sac has been found to have undergone an opposite change; instead of thicker, having become thinner than natural; probably from the absorbent vessels, in consequence of irritation, being stimulated to take on an unnatural degree of action.

A singular instance of this kind is preserved by my father in his museum, where the bowels of an umbilical hernia appear to be covered by the skin only.

The herniary sac has been, in several instances, destroyed by ulceration.

Mr

ed both from the common scrotal rupture, in which the hernial sac lies on the outside of the tunica vaginalis; and also from the hernia congenita, where the prolapsed part comes into contact with the testicle, having no other hernial sac besides the tunica vaginalis.

Mr Ruffel, furgeon, informed me of a case, where the sac of the hernia had become so transparent, that the vermiform contractions of the bowels were distinctly seen through it \*.

There are instances upon record, in which the herniary sac had become so thin as to burst from a slight degree of violence.

In different chirurgical authors, as Arnaud, &c. there are instances recorded, in which there were two herniary sacs, and with different passages of communication with the abdomen.

Tab.2d, fig.2d, represents a variety of that form of disease which, as far as I know, is not described by any author. It occurred in the person of a woman, who died in consequence of the operation for hernia. In this instance, a small herniary sac was found at the side of a much larger one; and, within the larger herniary sac, (which was filled only with bloody water), there were two smaller herniary sacs: so that there are four distinct sacs. When the operation was performed,

\* The same observation was made by Dr Marshall, reader on anatomy in London.

formed, it was necessary not only to cut through the larger sac, but also to divide the smaller sacs, before the intestines were exposed \*.

Mr Hunter, in his catalogue, when describing this preparation, observes, that it strongly illustrates one or other of the following circumstances: either the mode in which an old hernia is formed, or the process by which hernia is cured. But which of these processes was going on is very difficult to determine, as the previous history of the patient is not given in Mr Hunter's catalogue †.

It may be worth while to add, that, in consequence of the distention of the skin and cellular membrane over the sac, these become, in some instances, thicker than usual.

The degree of thickening of these parts depends, in some measure, upon the size of the tumour,

\* This table was taken from a preparation in the collection of the Royal College of Surgeons of London; and I am indebted to my very worthy friend, Dr Baillie, for it, as he got me their permission to take the drawing.

† Vid. Figures 2d and 3d of Tab. 2d.

mour, and duration of the disease, and takes place to the greatest extent in old herniae.

#### OF THE GENERAL CAUSES OF HERNIA.

THE causes of hernia are various and opposite.

1st, Sudden and violent muscular exertion.

2d, Blows upon the abdomen.

3d, Debility, or a partial degree of relaxation in the natural passages through the abdominal muscles.

4th, An unusual enlargement of one or other of the viscera of the abdomen or pelvis, so as to occasion distention of the parietes of the abdomen.

5th, An enlargement of the passage through the abdominal muscles by disease.

To the first head may be assigned all those instances of hernia, occasioned by the violent action of the diaphragm and abdominal muscles, as in raising and carrying heavy weights, or in leaping ;



leaping ; during the actions of vomiting, coughing, or laughing; or during the straining, in the exclusion of indurated faeces, or of the foetus in cases of difficult parturition.

Herniae, when produced in this manner, are the immediate consequence of the exertion, and attended with a considerable degree of pain.

To the 3d head may be referred all those instances of hernia which we meet with in infants ; and in females, naturally of a relaxed habit of body, whose constitutions have been enfeebled or broken down by having had many children; or, by age ; by long residence in a warm or moist climate ; by a sedentary life, or improper diet ; by bad health or the abuse of medicines \*.

Dr Camper is of opinion that the relaxation of the mesentery concurs with the relaxation of the abdominal

\* I attended a tall young man, of a weak habit of body, who, on account of a venereal eruption, was obliged to confine himself to his room for some time, and to take a considerable quantity of mercury ; in consequence of taking violent exercise upon getting abroad, he was seized with a hernia in each groin on the same day.



abdominal muscles in the formation of this disease \*.

It may be observed, likewise, that the disposition to hernia is peculiar to certain families; for, in some instances, it seems hereditary.

Those who are afflicted with hernia, in consequence of debility, seldom run much risk of strangulation. They are subject to a degree of fulness, sense of weight and pressure, and tension in the groin scarcely amounting to pain, which are increased by coughing, flatulency, or after violent exercise.

The tumour is at first small, becomes very gradually larger; and the pain is so trifling, that the patient, until the tumour has increased to a considerable size, remains ignorant of the nature of his disease.

Whether the ventral hernia is owing to the first or second of these causes, is still undetermined.

Most authors suppose that this form of hernia  
arises

\* “Relaxatur vero etiam mesenterium, ceditque vi muscutorum abdominis ac diaphragmatis; urgetur, propellitur, propter inguinum laxitatem, intestinum, omentum, scilicet utrumque.”

Vid. CAMPER de Bubonocel. page 11th.

arises in consequence of the relaxation of the muscular fibres of the parietes of the abdomen. But, it appears to me more probable, that it is generally occasioned by a rupture of some of the tendinous fibres ; as it happens most commonly at the linea alba ; occurs most frequently in robust young persons ; and is the immediate consequence of violent muscular exertion.

It may possibly likewise be the consequence of a partial weakness of the abdominal muscles, caused by absorption of part of their fibres. Do not the instances observed of general absorption, render such partial absorptions somewhat probable ?

The two causes of herniae above mentioned, viz. strong muscular action and partial debility, seem diametrically opposite to each other. Yet it cannot be doubted, however paradoxical it may appear, that these very opposite causes sometimes concur in the formation of the disease. A proof of this, is the frequent occurrence of the complaint among the negroes in the West Indies, equally exposed to the relaxing effect

effect of a warm climate, and to long and great muscular exertion.

An unusual increase in the bulk of any of the viscera of the abdomen or pelvis, to such a degree, as to occasion distention in the parietes of the abdomen, I have enumerated as a 4th cause of hernia.

To this may be imputed the frequency of umbilical hernia amongst old fat women. And hence, also, the umbilical hernia is the consequence of pregnancy; especially in women who have had many children, and at short intervals.

Authors, who describe the state of pregnancy, mention the projection of the navel, as a common symptom. The umbilical ring, in such cases, being distended beyond its natural size, is apt to remain so; and, consequently, the enlargement of the navel to continue, especially in women of a relaxed habit of body, even after delivery. This enlargement becomes greater and greater in every future pregnancy, until at last it terminates in a perfect umbilical hernia.

As

As all causes which enlarge the ring in the abdominal muscles, predispose to inguinal hernia, it seems probable, that the enlargement of the ring, in consequence of the testes passing through it, may be a predisposing cause of hernia congenita, or bubonocoele, and it has been observed, that by far the greatest number of children afflicted with hernia, are males.

A disease in the blood vessels of the spermatic chord produces the same effect. My father informed me of the case of a man, whom he attended, in which varix of the veins of the spermatic chord of the left side, of many years standing, seemed to have paved the way for an inguinal hernia.

The testes stopping at the ring, instead of passing down into the scrotum, as sometimes happens in adults, is another source of inguinal hernia.

Having given an account of the causes and various species of hernia; it may be necessary to point out the peculiarities of age and sex,



sex, or of constitution, more or less favourable to the different forms of hernia.

The foetus in utero, from not having breathed, and other causes, has not been found afflicted with hernia. Infants, especially in the first month after birth, if proper pressure has not been applied to the part, are extremely liable to suffer from umbilical hernia. If boys, the disease is less formidable, and of less consequence, as they commonly outgrow it ; but, in girls, it often lays the foundation of the complaint, especially when they become pregnant at an after period of life.

Boys are most subject to hernia congenita at or immediately after birth, as the canals through which the testes pass into the scrotum are not always then shut\*.

C

Dr

\* Infants of the female sex may be afflicted with a species of hernia congenita, as a canal, formed by the peritoneum, passes through the spermatic ring. This canal is about half an inch in length, and ends in a cul de sac. Vide Nuck Adenographia. Dr Camper informs us, that he found this canal open only in 3 of 14 female infants after birth ; and he adds, that he had discovered traces of that canal in women who died during delivery. Vid. Acad. Haarlem, tom. vi. and vii.

Dr Camper gives us \* the following observations with respect to the obliteration of that canal: he examined, for that purpose, the bodies of 17 new-born male children.

In 11, the canal was open on both sides.

In 3, a portion on the right side was open.

In 2, a portion on the left side was open.

In 1 only, the canal was obliterated on both sides.

Men are also sometimes afflicted with hernia congenita, owing to the original passage betwixt the abdomen and scrotum remaining open, and to the testes stopping at the ring of the abdominal muscles, instead of passing into the scrotum.

The testis keeps the uppermost part of the passage open, and it enlarges by the growth of the testicle. The bowels readily slip down into this passage, and are strangulated within it, in consequence of some violent exertion.

Such herniae can always be traced from the birth of the patient.

Women

\* Vid. Acad. de Haarlem, tom. vi.



Women, from corpulency, frequent pregnancy, or difficult labour, are often affected with umbilical hernia. They are also, for a reason which I shall endeavour to assign in the subsequent part of this paper, more subject to crural hernia than men.

Boys and men are more subject to bubonocoele than women, owing to the spermatic chord being of a much larger size than the round ligament of the womb; and perhaps also from the rings in boys being a little enlarged by the testes passing through them.

The young, active, and robust, are most frequently afflicted with ventral hernia.

#### OF THE DIAGNOSIS.

As, in the preceding part of this paper, a general account has been already given of the nature and varieties of herniae (with the exception of diaphragmatic hernia), it is only necessary in this chapter to enumerate those

symptoms which indicate the approach of the complaint, and those which are common to all kinds of the disease.

A constant sense of uneasiness or pressure around the groin, increased by coughing or exercise, and distinguishable by the hand applied to the groin, and occurring in a person of a relaxed habit of body, is, in many examples, the forerunner of hernia.

The situation, sudden appearance of the tumour, and sex of the patient, in some measure point out the nature of the disease ; but it is still more certainly, in some cases, determined by an accurate examination of the tumour, while the patient is in different postures. The sensation arising from the examination of such tumours will vary according to the nature of its contents.

When a portion of intestine only is included within the herniary sac, the tumour is soft and elastic, and seems as if filled with air : its contents seem to glide or to slip upon each other ; it disappears frequently with a gurgling  
noise

noise upon pressure, or when the patient lies down; it re-appears when he gets up. When the patient coughs, the tumour presses on the hand of the person who is employed in examining it; when the hand is removed, it increases in size. When a portion of the omentum is also included within the herniary sac, the tumour feels knotty, and is generally larger than where there is nothing but intestine within it; but if a quantity of faeculent matter is contained within the intestine, within the hernial sac, it is evident that such a tumour may bear an imposing resemblance to that containing omentum: hence the diagnostic symptoms must be drawn, not from the sensation which the touch communicates, but from the other concomitant symptoms.

The symptoms in the acute and chronic species of herniae are very different. The symptoms of the acute species very much resemble those of ileus, they vary a little, and come on more or less rapidly, according to the degree of stricture upon the protruded portion of bowel,

and according to the constitution of the patient.

The patient suffers very much from pain in the tumour propagated to other parts of the alimentary canal, which is soon followed by inflammation.

From the remarkable degree of sympathy subsisting between different parts of the alimentary canal, its action is inverted in cases of strangulated hernia ; nausea, excessive sickness, and vomiting, follow ; and, in some instances, a brownish yellow faeculent matter has been rejected by vomiting.

Nothing passes through the body.

In some instances, convulsions are the effect of hernia, and sometimes tetanus.

The pulse is generally small and quick, but sometimes not affected, though inflammation has been found to have occupied the protruded portion of intestine.

The skin is generally hot and parched. In the latter species of hernia, even where the protruded portion of bowel cannot be returned,

ed, the degree of constriction is so inconsiderable as not to impede the free circulation of blood through the vessels, nor the free passage of faeces through the protruded portion of intestine; so that, in this state of disease, the patient, by preventing costiveness, and by attention to diet, may enjoy a tolerable share of health.

Mr Callisen \* gives the following catalogue of symptoms, for assisting the surgeon in discovering whether or not there is an adhesion between the protruding portion of intestine and herniary sac :

*Signa specialia, quae adhesionem partium elapsarum aut inter se, aut cum sacco hernioso, ejusque naturam agglutinativam, fibrosam, fungosam, totalem intimumque coalitum indicant, ex herniae vetustate, et longiore extra abdomen mora, partiali aut totali immobilitate, absque incarcerationis notis, interdum tamen, cum hoc statu juncta, desumuntur; (he very justly adds), certitudine tamen carent, donec,*

\* Vid. *System. Chirurg. Hodiern.* pag. 452. vol. 2. edit. 2da



donec, incisione adhibita, clarius elucescat mali natura.

The symptoms of gangrene having affected the hernial tumour are, pain in it suddenly ceasing, though the strangulation has not been removed ; pain in the abdomen, as inflammation in other parts of intestine has not run on to gangrene ; tumour so flaccid as to retain the marks of the pressure of the finger ; leaden or blackish colour of the tumour ; separation of parts of its cuticle ; little vesicles under the cuticle ; sinking of the pulse, and coldness of the extremities.

May we not conjecture that a patient labours under diaphragmatic hernia, providing he is afflicted with the usual symptoms of hernia, without any external tumour, when he has had a degree of difficulty in breathing during the greater part of his life, when all the symptoms are much aggravated by violent exercise, and when a sound like that of borborygmi may be heard in the thorax, when the patient ceases for a moment to act with his diaphragm, or to move his ribs ?

## OF THE PROGNOSIS.

IN every species of hernia, the prognosis is unfavourable, in so far, at least, as relates to the complete recovery of the patient.

In the early part of life, indeed, the disease is often cured by pressure alone, especially in cases of umbilical hernia in children; and there are instances of a complete cure being performed, in this way, on persons more advanced in life, though these are not very numerous, as the disease, though in appearance cured, is apt to recur.

It is, therefore, from a surgical operation only, that persons of a certain age can expect a perfect cure; but though the disease is in general only to be palliated, it seldom proves fatal, unless from accident or neglect: because, when the hernia can be returned and retained by proper pressure, all danger is avoided.

The prognosis depends upon the nature of  
the

the contents of the hernial tumour, as the danger arises from the degree of stricture upon these. If the omentum only is protruded, no bad consequence generally ensues, as it does not seem to serve any very essential purpose in the animal economy, unless the degree of stricture is so great as to impede the free circulation of blood through the protruded portion, which produces mortification, and, in some examples, the death of the patient.

Protrusions of the omentum are to be regarded with a suspicious eye on another account, as they often pave the way for a protrusion of a portion of intestine; and also as the omentum, when once down, does not so readily return into the cavity of the abdomen, as a portion of intestine; or the stricture produces, in some cases, an induration or enlargement in the protruded omentum, which cannot, in that state, be returned through the neck of the sac. In those cases where, owing to an adhesion of the omentum to the sac, pressure cannot be applied with advantage, the ring  
is

is commonly so much enlarged as to preclude all danger of strangulation ; and persons afflicted with such chronic herniae have less chance of obtaining a radical cure than those afflicted with the acute herniae.

In the acute hernia, there is always great danger, if the bowels cannot be immediately returned, as inflammation and its fatal consequences, so quickly and so certainly follow ; and, in chronic hernia, the complaint has been known to terminate fatally, from stricture of the intestine, when very little pain or inflammation had been induced, and where the medical attendants had, from such circumstances, been lulled into a fatal security.

ON



## ON CRURAL HERNIA.

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HAVING premised such general observations as seem necessary for explaining and elucidating the nature of hernia in general, I shall now proceed to explain the peculiar nature of crural hernia, the manner in which the crural arch is affected in the disease, the relative situation of the neighbouring blood-vessels and nerves in respect to the tumour, the effects of the stricture of the crural ring upon the contents of the tumour and its sac, and the peculiar symptoms of crural hernia. I shall then consider what prognosis may be formed, and, lastly, point out the safest mode of removing the complaint by a surgical operation.

As was proposed, I shall premise an anatomical description of the crural arch.



ANATOMICAL DESCRIPTION OF THE  
CRURAL ARCH.

MR GIMBERNAT is the only author who appears to have examined the structure of the crural arch with that attention which the importance of the subject requires.

From the peculiar structure of parts, he has in part explained the reason why crural hernia is less frequent than bubonocoele, and has also pointed out not only the safest, but also the surest mode of taking off the stricture upon the protruded portion of intestine, or of performing the operation for crural hernia. His description is, however, rather too minute, and somewhat obscure; chiefly owing to the want of suitable plates, for the plates annexed to the English translation of his treatise (which, I presume, were faithfully copied from the original plates) are executed in such a manner as by no means to illustrate properly the text of the author. Besides, even though well executed,

cuted, they do not appear to me to exhibit such views of those parts, as can convey an accurate idea of the situation or structure of the crural arch.

Another great imperfection, which applies equally to Mr Gimbernats description and plates, is, that he describes and exhibits views of the crural arch in the male subject only, which I have discovered to be materially different in structure in the female, although the knowledge of the parts in the female is of infinitely more moment, as women are most liable to crural hernia.

Mr Hey observes, page 150 : " I have now performed the operation for the femoral hernia 14 times in the female, and twice in the male : " and, in page 154, he observes, " In all the instances of strangulated intestinal hernia in females, which have occurred in my practice, the hernia was of the femoral kind \*."

OF

\* Vid. Practical Observ. in Surgery.

OF THE STRUCTURE OF THE UNDER PORTION OF  
THE TENDON OF THE EXTERNAL OBLIQUE  
MUSCLE OF THE ABDOMEN, FORMERLY CALLED  
LIGAMENT OF POUPART OR FALLOPIUS, NOW  
CRURAL ARCH.

IN drawing out this description of the crural arch, I have, in several particulars, availed myself of the previous labours of Albinus and Gimbernat.

A strong and broad tendinous aponeurosis is attached to the lower portion of the external oblique muscle of the abdomen. The stronger fibres of that aponeurosis descend obliquely inwards and downwards, and are disposed nearly parallel with respect to each other: there are also many thin tendinous fibres which pass across the larger fibres, and which describe a small part of a circle, and are directed upwards.

The tendon is fixed to the anterior spinous process of the ileum, and its lowest part to  
the

the ossa pubis and their synchondrosis; and is described by Mr Gimbernat, as forming a duplicature inwards, and as forming a canal for the spermatic vessels in the male, and the round ligament of the womb in the female. On pressing the under part of the tendon between the finger and thumb, it feels thicker than any other part of the tendon, and there seems to be a certain proportion of ligamentous matter added to it.

It is thicker and broader towards the ossa pubis, than near the anterior superior spinous process of the ileum.

The aponeurosis of the external oblique muscle divides into bands, to form the inguinal ring, one of which goes before, the other goes behind the spermatic chord of the male, or round ligament of the female.

That which passes behind, is inserted into the crest of the pubis.

This division of the fibres of the tendon into two chords, which form the ring, takes place in some subjects, two or three inches above the ring; in others, near the ring.

The



The intermediate substance is covered by a very thin tendinous aponeurosis, through which the fibres of the internal oblique muscle are seen, and the cremaster muscle in the male.

The ring is somewhat of an oval figure, and there is a small quantity of cellular substance, and scattering tendinous fibres within it.

The spermatic chord of the male, and round ligament of the womb in females, passes through it.

The tendinous aponeurosis, which covers the muscles of the thigh, is said to take its origin from the crural arch; we should rather say, it is strongly connected to the crural arch, for the fibres of both aponeuroses seem to be interwoven. This intimate union of parts keeps the crural arch tight; upon bending the thigh, or cutting the fascia of the thigh, the crural arch is relaxed.

The crural blood-vessels, lymphatics of the inferior extremities, and tendons of the inter-



nal iliac and great psoas muscles and bowels, in cases of crural hernia, pass behind the crural arch.

As no verbal description can convey so accurate an idea of the relative situation of the internal parts as a plate, instead of delivering a full account, in words, of the structure of the crural arch on its inner side, I refer the reader to the explanation of plate 3d, fig. 1st, and plate 4th, fig. 2d.

The thickened portion of the tendinous aponeurosis of the external oblique muscle somewhat resembles a vault, and hence it is called crural arch.

A little below this ligament, or aponeurosis, next to the pubis, a duplicature of aponeurosis is placed, which passes upwards and inwards, and is attached to the aponeurosis which covers the internal iliac muscle: This duplicature Mr Gimbernat names the internal edge of the crural arch. Vid. a, b, c, d, tab. 3d, fig. 1st. \*

This

\* This part, marked by letters c, d, plate 3d, fig. 1st, is divided by him in performing his operation for crural hernia.

This duplicature may be distinctly perceived by passing a finger along the external iliac blood-vessels (the abdomen having been previously laid open), into the aponeurotic sheath of the external iliac artery and vein.

It presents a firm and resisting surface ; its edge is very thin ; and I discovered that it is considerably broader in the male than in the female.

When the thigh and leg are raised to nearly a right angle with the body, the internal edge of the crural arch is much less distinctly felt, than when every part of the body is in the horizontal position ; and hence, in such a posture, the bowels may not only more readily push downwards, and form a crural hernia, but, when down, they will be more readily returned into the cavity of the abdomen.

Hence the surgeon should, while attempting what surgeons call the taxis, or, in plainer language, an attempt to return the protruded bowels into the abdomen, always bend the

thigh of that side to nearly a right angle with the body.

The round ligament of the uterus passes obliquely through the abdominal muscles, and is surrounded by cellular substance, which Mr Gimbernat describes as forming a canal. A tendinous aponeurosis, composed of longitudinal fibres, which are crossed by other thin fibres, covers the internal iliac muscle, and is intimately united with the crural arch; so that crural hernia can only happen on the inner side of the external iliac vein.

Between the external iliac vein, and the spine of the os pubis, there is a small aperture, which is formed by the crest of the os pubis passing obliquely inwards, and by the under and inner portion of the crural arch, which is attached to the spine of the os pubis \*.

This aperture is much more considerable in the female than in the male pelvis, not only on account of the difference in the form and length of the bones of the sexes, but also  
on

\* Vid. plate 3d, letter x, fig. 1st; and tab. 4th, fig. 2d.

on account of the very different shape of the internal part of the crural arch next the pubis\*.

A tendinous sheath encloses the external iliac vessels, and other parts; the fore part of which is formed by the upper and inner portion of the fascia lata of the muscles of the thigh, (which fascia takes its origin from, and is attached to the inner side of the crural arch), and the back part of it is formed by the continuation of the tendinous aponeurosis of the internal iliac muscle, which passes behind the external iliac vessels, and is inserted close to the external edge of the pectineus muscle.

Another portion passes over the pectineus muscle, and is inserted into the ossa pubis.

The external iliac blood-vessels fill up the principal part of the orifice of the sheath: the round ligament of the uterus of the female, or spermatic chord in the male, shuts up a little of the external side, and the epigastric vessels cover its anterior and internal part, on

D iij.                      their

\* Compare fig. 1st of plate 3d; and fig. 2d of plate 4th.

their way to the rectus muscle of the abdomen.

The epigastric artery is commonly sent off from the anterior part of the external iliac artery, before it enters the sheath; and the circumflex artery from the external and lateral part of the external iliac artery, after it has entered the sheath.

OF THE SITUATION, SIZE, AND FIGURE OF  
THE CRURAL HERNIA.

IN the crural hernia, the bowels are protruded through an aperture on the inner side of the external iliac vein, which, in fig. 1st of plate 3d, is marked by the letter x.

The crural hernia is less frequent than the inguinal.

It is much more prevalent amongst females than males, because the crural arch of the female is longer and looser than that of the male, owing to the greater width of the female pelvis. Besides, the internal  
edge



edge of the crural arch is not nearly so broad next the pubis in the male as in the female ; and hence the crural ring of the female is larger, and the bowels are more readily protruded through it \*.

On the other hand, women are less subject to inguinal hernia than men, from the round ligament of the uterus being of smaller size than the spermatic chord, and also from a greater portion of the posterior part of the canal, through which the round ligament of the uterus passes, being supported by the internal edge of the crural arch †.

Crural hernia appears, from the statement of Arnaud, to be more frequent amongst married than unmarried women. He informs us, that of twenty women afflicted with crural hernia, nineteen were married.

In cases of crural hernia, the tumour is less moveable than in scrotal hernia, as it is immediately

\* Compare fig. 1st of plate 3d with fig. 2d of plate 4th.

† Figure 2d of Dr Camper's 13th plate illustrates that part of structure in the female.

mediately covered and bound down by the tendinous aponeurosis of the muscles of the thigh; and sometimes also, in consequence of inflammation bringing on adhesion, the tumour is firmly united to the surrounding cellular membrane.

The neck of the tumour, from the pressure of the crural arch, is commonly narrow \*.

The body of the tumour is generally of a smaller size than that of a scrotal hernia: it is not exactly round, but a little flattened, from the pressure of the tendinous aponeurosis of the muscles of the thigh.

In some instances, the tumour seems as if it were tilted upwards upon the crural arch: The crookedness of the passage must increase the difficulty of returning the bowels into the cavity of the abdomen, and consequently renders the risk of strangulation much greater than usual.

In the scrotal hernia, the tumour sometimes acquires a great size, as the peritoneum not  
being

\* Vid. fig. 2d of plate 3d.

being here supported by a tendinous covering, gradually gives way to the weight of the bowels ; one portion dragging another after it, until at last the tumour has been found to contain a large share of the moveable part of the alimentary canal, and to hang down nearly to the patient's knees, notwithstanding which, he often enjoys a tolerable share of health.

From the above description of the situation, size, and coverings of the crural hernia, it is obvious, that a surgeon will find much more difficulty in discovering the nature of this disease, and of ascertaining the contents of the tumour, than in scrotal hernia ; and that the diagnostic in this hernia must be more difficult, as it may readily be mistaken, in its beginning, for an enlargement of one or more of the neighbouring lymphatic glands, or for a collection of matter pushing downwards from a lumbar abscess.

OF THE SITUATION OF THE BLOOD-VESSELS IN  
RESPECT TO THE HERNIAL SAC.

FIG. 2d of plate 1st points out the situation of the neighbouring blood-vessels, and spermatic chord, in respect to a scrotal hernia.

It exhibits an inside view of the pelvis of a boy who had been afflicted with a scrotal hernia; and it shows that the epigastric artery passes beneath the spermatic chord and vas deferens, then behind and on the inner side of the hernial sac, in its course to the inner side of the rectus muscle of the abdomen.

The situation of the spermatic chord, vas deferens, and epigastric artery, in respect to the herniary tumour, however correspond with Dr Camper's description and plates, although this is a different view: and, in justice to him, it is necessary to add, that in his *Observat. Anat. Patholog.* (edit. 1762), he had described the epigastric artery as being placed at the inner side of the hernial tumour, in  
the

the following passage: “ Arteria cum vena epigastrica simul ac rectum musculum incedit, haec vero pubi, illa ilium offi proprior est, funiculus spermaticus abdomen egrédiens arteriae adjacet: in herniis inguinalibus arteria et vena epigastrica versus pubem a prolapsis intestinis compelluntur.”

Having given such a description of the situation of the epigastric artery, it seems very strange that he should have conceived it not possible to divide the epigastric artery in performing the operation for bubonocoele; for his own plates prove, in the clearest manner, that as the epigastric artery is placed on the inner side of the inguinal hernia, it may be divided, if the surgeon makes a long incision inwards, towards the linea alba.

Mr Rougemont, the translator of Richter's excellent treatise on hernia, states, in the subsequent passage, the sentiments of several very celebrated surgeons, with regard to the situation of the epigastric artery, in respect to the hernial sac, in cases of bubonocoele, and also  
their



their methods of performing the operation for the removal of that kind of hernia.

He adds several very pertinent observations, which, to me, seem to merit insertion in this paper \*.

Plate

\* Les sentimens sont partagés sur la situation de cette artère au côté interne ou au côté externe de l'anneau, ceux qui la croient placée en dehors, recommandent d'inciser l'anneau en dedans, ceux qui la croient placée en dedans, recommandent d'inciser l'anneau au dehors. Mr RICHTER est, comme on voit, du premier sentiment, & dit formellement : *L'artère épigastrique passe ordinairement à l'angle externe & supérieur de l'anneau, & il est évident qu'on s'expose à l'ouvrir, si on incise l'angle externe de l'anneau.* Messieurs CHOPART & DESAULT prescrivent une variation dans la direction de l'incision, ils admettent l'artère épigastrique au côté interne de l'anneau, & rarement au côté externe dans le cas de hernie, de manière qu'ils prescrivent de diriger ordinairement l'incision en haut & en dehors, quand le cordon est derrière & au côté interne du sac ; & en haut & en dedans, quand le cordon est au côté externe du sac. Pour accorder ces divers sentimens, il suffit d'examiner un moment la disposition des parties, pour voir que l'opinion de Mrs. CHOPART & DESAULT est fondée sur une autopsie exacte. Le conduit déférent & les vaisseaux spermatiques en traversant l'anneau pour se rendre dans le Tissu cellulaire du péritoine sont placés au côté externe de l'artère épigastrique & comme ces parties suivant une direction oblique de dedans en dehors, il s'ensuit qu'en examinant la chose dans un Cadavre où il n'y a point de hernie, on voit réellement l'artère épigastrique plus ou moins près de l'angle externe de l'anneau, ainsi il n'est point surprenant qu'en

incisant

Plate 4th, fig. 1st, exhibits an inside view  
of the pelvis of a woman who died in conse-  
quence

incisant dans le Cadavre de l'angle interne de l'anneau transversalement vers la ligue blanche, Mr MOHRENHEIM n'ait jamais incisé cette artère, tout cela est vrai quant à l'état naturel des parties, mais si l'on examine la disposition de cette artère dans des sujets qui sont morts avec des hernies, on trouvera ordinairement l'artère épigastrique à l'angle interne de l'anneau, & si on divise alors transversalement de l'angle interne vers la ligne blanche, on coupera sans contredit cette artère. Dans tous les sujets que j'ai disséqués, & qui avoient des hernies inguinales, j'ai toujours trouvé d'après la remarque de Mr DESAULT l'artere épigastrique vers l'angle interne de l'anneau, & je n'ai encore vu qu'une exception : au moment où je rédige cette note, j'ai reçu un Cadavre avec une hernie inguinale au côté gauche, où j'ai fait voir l'artère épigastrique placée au côté interne du commencement du sac : mais dira-t-on, comment cette artère placée ordinairement à l'angle externe de l'anneau peut-elle se trouver dans une hernie inguinale vers l'angle interne, je répondrai que ce changement de position est produit par les viscères, qui s'échappant de dehors en dedans, de haut en bas, poussent le cordon en dedans, & à la partie postérieure de l'ouverture de l'anneau, or comme l'artère épigastrique est placée au côté interne de ces vaisseaux spermaticques, elle est nécessairement déviée plus en dedans : d'ailleurs les hernies inguinales se forment ordinairement par l'angle externe de l'anneau. (Voyez ci-dessus pag. 61.) & le changement de position, dont je parle, a été décrit par l'illustre Mr. CAMPER, qui dit expressément : *Arteria cum venâ epigastricâ simul ad rectum musculum incedit, hæc vero pubi, illa ilium ossi propior est, funiculus spermaticus abdomen egrediens arteriæ adjacet : in herniis igitur inguinalibus arteria & vena epigastrica versus pubem a prolapsis intestinis compelluntur.* L. c. D'après toutes ces considérations

quence of crural hernia. The epigastric and obturator arteries have a common origin, as marked by letter f.

Plate 5th, fig. 1st, gives an outside view of  
the

fidérations j'en conclurai avec Mr DESAULT que l'artère épigastrique dans la hernie inguinale est ordinairement placée près de l'angle interne de l'anneau, & rarement vers l'angle externe. Les cas où cette artère est placée à l'angle externe de l'anneau dans la hernie inguinale sont fort rares, & ils n'arrivent vraisemblablement que lorsque les viscères sortent par la partie interne de l'anneau, & alors le cordon est placée au côté & un peu derrière le sac, j'ai eu occasion il y a deux ans d'observer cette disposition sur un Cadavre, j'ai conservé cette pièce pendant quelques mois, & l'ai montrée à quelques personnes de l'art. Le celebre Mr MICHAELIS rapporte un fait semblable, il s'exprime ainsi dans une lettre à l'illustre Mr RICHTER. " J'ai vu à Londres  
" une pièce anatomique, où une hernie inguinale n'étoit point  
" placée comme a l'ordinaire au côté externe de l'artère épigastrique, mais au côté interne de cette artère, de manière qu'on  
" l'auroit divisée, si on eut dilaté l'anneau en dehors, comme on  
" le fait ordinairement. Quand cette disposition sur 200 hernies ne se trouveroit qu'une seule fois, elle seroit toujours un  
" fort argument en faveur du dilatatoire de LE BLANC." V. RICHTER's chirurg. Bibliothek. T. VI. p. 159. Je crois d'après cela qu'il est permis de conclure qu'on court moins de risque de lésér l'artere épigastrique en incisant en haut & en dehors, qu'en incisant en haut & en dedans ; que pour reconnoître exactement la disposition de cette artère il faut s'assurer de la position du cordon spermatique relativement au sac, & supposé que cela soit impossible, il faut inciser au milieu du bord supérieur de l'anneau directement en enhaut.)

the body of the same woman, in which the farther course of this artery, and its situation in respect to the herniary sac may be traced, the portion of the abdominal muscles that covered it, having been purposely removed.

The epigastric artery appears about half an inch from the outer side of the neck of the sac, then passing obliquely inwards and upwards to the rectus muscle of the abdomen.

From the preceding plate, it appears, that the surgeon runs little risk of dividing this artery, unless he makes his incision larger, and more outwardly on the neck of the sac, than is proper.

Plate 6th shows the epigastric artery more upon the fore part of the tumour, and its relative situation with respect to the round ligament of the uterus, a portion of the abdominal muscles having been cut out for that purpose.

Upon the whole, the particular situation of this artery with regard to the hernial sac must depend upon the part of the external iliac artery,



artery from which it takes its origin, which will be found to vary a little in different examples. I have seen the epigastric artery sent off from the external iliac artery more than an inch above its exit from the pelvis. I have seen also the epigastric artery and internal circumflex of the pelvis come off from the external iliac artery by a common trunk within the pelvis.

Besides the epigastric artery, there is another artery, which is in danger of being wounded in performing the operation for crural hernia.

I allude to the obturator artery, which though it commonly arises from the internal iliac artery, yet sometimes, as in figure 1st of plate 4th, takes its origin in common with the epigastric artery.

Richter, in his treatise on hernia, observes, that he had met with such a lusus \*;  
and

\* Il n'est pas très rare de voir l'artère obturatrice naître avec l'épigastrique par un tronc commun l'artère iliaque. J'ai vu  
cette



and Professor Murray, of Upsal, makes a similar remark \*.

From the descriptions of these celebrated authors, the reader is led to suppose, that such is by no means an unfrequent *lusus naturae*. It is impossible to determine such a point with mathematical precision: According to my observations, it does not occur in above one of twenty-five or thirty cases.

E

In

cette artère obturatrice dans un cas semblable se porter derrière la partie interne du ligament de Poupart, & se recourber ensuite pour gagner la partie supérieure du trou ovalaire, de manière qu'il peut aisément arriver que les parties en s'échappant par l'angle interne du ligament de Poupart (comme c'est le cas le plus ordinaire) passent derrière cette artère, de sorte que le principe du sac soit environné en devant, en dedans par un Demi-cercle artériel formé par l'obturatrice, en dehors il y a toujours l'artère epigastrique; ainsi la dilatation dans cette circonstance dans quelque direction qu'on la fasse en dehors, en dedans, en devant est toujours unie au danger de blesser une artère assez considérable, & comme on ne peut reconnoître cette disposition de l'artère obturatrice, & comme elle n'est point infiniment rare, je crois qu'on peut encore considérer cette variété comme une raison, qui doit nous engager à tenter la dilatation.

\* Pag. 81. Obturatoria. jam ex iliaca externae ramo epigastrico, deorsum ad pelvim, nonnunquam arteriam ablegante, jam vero et quidem frequentius ex hypogastricae tronco, sive arteria iliaca posteriore vel ischiadica, vel ilio lumbari pronascitur.

In fig. 1st of plate 4th, the obturator artery, having arisen along with the epigastric artery by a common trunk, passes on the outer side \* of the hernial sac of a crural hernia, in its course to the foramen obturatorium. Richter, in a similar lusus naturae, describes the situation of the obturator and epigastric arteries, in respect to the hernial tumour, in these words: “ De sorte que le principe du sac soit environné en devant, en dedans par un demicercle arteriel formé par l’obturatrice, en dehors il y a toujours l’artere epigastrique.”

An intelligent surgeon of this place, Mr Thomson, showed me a drawing of a crural hernia lately, in which the obturator artery, after having arisen, along with the epigastric, by a common trunk, passes on the upper, and then on the inner side of the neck of the hernial sac, and seems as if it surrounded it.

Mr

\* By outer side, I mean, on the side next the anterior and superior process of the os innominatum; by inner, that part of the hernial sac next the pubis.

Mr Thomson observed, that he had found such a distribution of the obturator artery to take place in six out of ten preparations he had examined ; and therefore considered this circumstance as forming an insuperable objection to the mode of operating in crural hernia, proposed by Mr Gimbernat.

In fig. 1st of plate 3d, the epigastric and obturator arteries are seen coming off from the external iliac artery at the same place, but not by a common trunk.

I have seen the obturator artery sent off from the external iliac artery about an inch and a half above the epigastric artery.

I have seen another variety of *lusus naturae*, with respect to the origin of the obturator and epigastric arteries : In this variety, the epigastric, obturator, and internal circumflex of the upper part of the thigh were derived from the femoral artery about an inch below the crural arch.

I have stated all the varieties that have fallen under my observation with respect to the

origin and course of the epigastric and obturator arteries, in order to point out to surgeons the possibility, nay probability, of dividing the epigastric or obturator artery in performing the operation for crural hernia.

The epigastric artery has been several times divided in performing that operation; and, in an instance which occurred lately, so great a quantity of blood was lost, and there was so much difficulty in taking up the artery by ligature, in consequence of its retraction, that as the operator (a surgeon of great eminence) emphatically expressed himself, it threatened to pour out the patient's life with her blood.

Even wounds of the smaller branches of the epigastric artery, sometimes prove fatal. Dr Carmichael Smyth has related the histories of two such cases, and makes mention of other similar cases which were communicated to him, in which the patients lost their lives by a wound made in the smaller branches of the epigastric artery, in performing

forming the operation of tapping for dropfy of the belly \*.

#### OF THE SAC OF CRURAL HERNIA.

It is formed in the fame manner as the fac in other instances of hernia, viz. by the peritoneum, which is pushed downwards and forwards before the protruded bowels : but the bowels, in a cafe of crural hernia, have the additional covering of the tendinous aponeurosis of the muscles of the thigh, which prevents the nature and contents of the tumour from being fo readily discovered as in cafes of fcrotal hernia.

In fome instances of crural hernia, two sacs have been discovered.

Instances, in which there are two sacs, in cafes of crural herniae, are related by Mr Cal-

E iij

lifen,

\* Vid. Lond. Med. Communicat. vol. ii. pag. 484.



lifen \*, and Mr Hey †, from whose works I have made extracts.

In the transactions already quoted, Mr Cal-lifen has given the histories of two such cases (both patients were females, and considerably advanced in life :) in one of which, the disease was removed by a surgical operation ; in the other, the patient died after an operation had been performed. After enumerating the previous symptoms of the disease, he gives the following account of the situation of the hernial tumour.

One of these tumours was situated “ supra ligamentum Fallopii, vero muscoli obliqui aponeurosis in tumorem ovi columbini magnitudinem aequantem extensa erat, qua una cum peritoneo caute incisa intestinum inflammatum ex atro rubescens apparuit.”

The patient died after the operation ; and, upon inspecting the body after death, he  
found

\* Vid. Act. Soc. Med. Havniens. vol. ii. page 321.

† Vid. Practical Observations in Surgery.

found that the patient had not died in consequence of the operation, but in consequence of a portion of the intestinal canal being strangulated within another hernial tumour. "*Causam mortis non in hoc loco, nec in notabili inflammatione intestinali inveniens, denique ansam intestini ilei fatis magnam, in sacco ab extenso peritonæo singulari modo efformato inclusam detexi, Peritonæum nempe sub ligamento lato sinistro versus superiora ad musculi Psoas tractum saccum formabat, in quo intestini pars gangræna correpta ad angulum acutum reflexa continebatur, quæ reflexio viam intestinalis cavi præcluserat.*"

Mr Hey has given a very full history of a case in which there were two hernial sacs, but which were very differently situated; which I shall also insert.

"In January 1796, I was desired to visit Mrs Brooke of Harewood, whom I had some years ago cured of a strangulated femoral hernia by the operation, and who now laboured under the same disease on the opposite side.

The

The strangulation had subsisted three days. She vomited frequently, and had had no stool; yet the abdomen was soft, her pulse calm, and her tongue clean.

“ I immediately performed the operation. There was nothing in the hernial sac but omentum, except a large quantity of serous fluid. The omentum was in part gangrened, and adhered to the sac. I could find no aperture into the abdomen. My patient seemed convinced that the intestine had been down before I began to perform the operation; and from the accurate description which she gave me of the different states of her disease, I saw no reason to doubt the truth of her conjecture. She assured me that, during the operation, she had the sensation which she was accustomed to feel whenever the intestine retired into the abdomen. The hernial sac was much wrinkled, as if, after being distended, it had fallen into a collapsed state. I cut off all that part of the omentum which appeared diseased, as well as all that projected from the hernial  
sac.

fac. That part which appeared found, and adhered closely to the sac, I suffered to remain, lest I should wound the sac ; for its irregular wrinkled surface made the excision difficult.

“ The patient recovered very well, but the hernia returned, and a truss was applied to prevent the intestine from descending as usual.

“ In this case, it seems to me highly probable, that the interior surface of the omental sac became the exterior surface of the intestinal one. Had not the intestine retired while I was dividing the hernial sac, I should have found a double hernia, one omental, and the other intestinal.”

These are very important cases, and serve to point out to surgeons the necessity of a minute examination into the nature of the disease, and of the symptoms which follow the operation for the removal of hernia.

OF THE CONTENTS OF THE SAC OF THE  
CRURAL HERNIA.

THE contents of the crural hernia do not essentially differ from those of other herniae; and, therefore, what has been stated with regard to the contents of hernia in general applies also to this form of disease.

In instances of crural hernia, a small portion of the ileum is most frequently found within the tumour; sometimes only one part of intestine has been constricted.

But the omentum has not been so often discovered within such tumours as in umbilical or scrotal herniae; these have been sometimes found to contain omentum alone.

What has been said as to the consequences of strangulation in other herniae applies also to crural hernia.

In cases of crural hernia, the bowels are less readily reduced than in other species of this disease, on account of the narrowness of the neck of the sac, as is seen in fig. 2d of tab. 3d,  
and



and in plate 6th ; and also on account of the crooked direction of the tumour with respect to the abdomen, as already stated : and hence also they are more frequently strangulated, especially as the crural hernia happens suddenly, and most frequently occurs after violent muscular exertion.

Fig. 2d of plate 5th shows the effect of inflammation upon a portion of the ileum which was contained within the sac of a crural hernia.

Upon making an incision into the intestine, with a view to ascertain the change which inflammation had produced, its coats were found considerably thickened, with a layer of coagulable lymph, nearly one fourth of an inch thick, effused on the inside of the protruded bowel ; and, at one part, the stricture was so complete, that even a small probe could not be passed through it.

The outer portion of the protruded intestine adhered, by a layer of coagulable lymph, to the sac which contained it.

# DIAGNOSIS OF CRURAL HERNIA.

ON account of the very small size of the tumour, it is often very difficult, by an examination of it, by pressure with the fingers, to discover the nature of its contents, as may generally be done in cases of scrotal or umbilical herniae, especially as the tumour, in cases of crural hernia, has an additional tense covering from the tendinous aponeurosis of the muscles of the thigh; besides which, in many instances, one or more of the inguinal lymphatic glands are situated at the side of or over the herniary sac.

The general or sympathetic symptoms of all kinds of herniae are nearly the same; and hence it is only necessary to examine with attention the symptoms of such local diseases as may counterfeit a crural hernia.

As a crural hernia may be very readily mistaken for a swelling of the inguinal lymphatic glands,

glands, or for the under part of a lumbar abscess, it becomes more necessary to detail also the symptoms of such cases.

The lymphatic glands of the groin are often swollen in consequence of lues venerea, scrofula, and cancer.

Hernia may be distinguished from a venereal bubo by attending to the peculiar feeling of the tumour, the progress of the tumour towards suppuration, and the general symptoms.

The bowels are not affected by a venereal bubo, as by hernia; in the former, the tumour is hard, often knotty; cannot, by pressure, be made to disappear, or to become less; and is generally situated in the uppermost cluster of inguinal lymphatic glands.

Notwithstanding these and other marks of distinction, surgeons of the greatest eminence have sometimes mistaken hernia for a venereal bubo, or a venereal bubo for a hernia.

Sabatier

Sabatier acknowledges that he mistook a venereal bubo for a crural hernia \*.

Mr Elfe † met with a singular case of crural hernia, in which the hernial tumour was placed behind a swelled lymphatic gland of the groin; which complication of disease might very readily have deceived a surgeon.

The subject of this case had been a physician's patient, in St Thomas's Hospital, on account of rheumatic pains, but which his physician concluded to be venereal. He had gone out in a coach, and said, that, from the jolting of the coach, a swelling had come on in his groin. Mr Elfe directed a poultice to be applied to the tumour.

The person died in three days, with all the symptoms of strangulated intestine. Mr Elfe  
opened

\* Sans doute, qu'on a pris aussi, quelquefois des bubons veneriens pour des hernies. Cette meprise m'est arrivé une fois, et je ne crains pas de l'avouer, afin d'attirer sur ce point l'attention des personnes à qui cet ouvrage est destiné.

Vid. De la Med. Oper. tom. i. pag. 147.

† Vid. Lond. Med. Obs. & Inq. vol iv. page 355.

opened the body, and gives the subsequent account of the dissection.

“ I procured leave to open the body, and, raising the integuments, laid bare the lymphatic gland which I had felt, which was much enlarged and inflamed. I then dissected Poupart's ligament very clean; and though I raised up the edge of the gland all round with my finger, I could discover no appearance of a hernial sac. I then cut into the substance of the gland, without being able to see any thing like a rupture. After this, I made an opening into the cavity of the abdomen, and presently saw that a very small portion of the ileum had descended, and was strangulated. The intestine above the strangulated part was livid, where I made an incision into it, and found that I could pass a blow-pipe, or my finger, along the intestinal canal beyond the strangulated part, and without interruption from it. On dissecting away the lymphatic gland, I saw that a small portion of the intestinal tube, about the size of a hazle-nut, had descended.”



A quantity of fat, or a collection of hydatids, on the inner side of the groin, may resemble a herniary tumour in some degree.

Of the latter form of disease, an excellent specimen is preserved in my father's museum, in which a sac, the size of an egg, which contained within it a quantity of hydatids, was removed from the upper and inner portion of the thigh, which might readily be mistaken for a hernia, as the hydatids contain a watery fluid, have thin and elastic coats, which communicate to the sense of touch nearly the same kind of sensations as a protruded portion of intestine, and are contained within a sac very similar to a hernial sac

Another case, somewhat similar, is described, in Deault's Chirurgical Journal, by Mr Manoury, in which a large hydatid lay over the place where the bowels protrude in cases of inguinal hernia: It had been mistaken by a surgeon for a hernia \*.

Lumbar

\* Vid. 252, tom. i. The history of the symptoms of this case, and the mode of distinguishing this complaint from hernia,

Lumbar abscess may be very readily mistaken for a crural hernia, especially as the purulent matter does not always follow the course of the psoas muscle.

The lumbar abscess is distinguished from hernia by the previous symptoms of inflammation in the side, resembling the symptoms  
of

is given in the following passage :—" Pressant légèrement cette tumeur entre les doigts, il y sentit de la fluctuation : ce signe étoit encore équivoque ; il a aussi lieu dans les hernies dont le sac contient beaucoup de sérosité : mais une lumière, placée au côté opposé à celui où l'on regardoit cette tumeur, la rendoit transparente dans toute son étendue, et si on la déprimoit avec la main, en la tirant en bas, elle s'éloignoit de l'anneau et laissoit entre elle et cette partie un vide où l'on pouvoit enfoncer le bout du doigt et reconnoître qu'elle n'étoit formée par aucun prolongement de la cavité du bas-ventre."

An operation was performed by Desault, who made an opening into the hydatid, and found, in the anterior and upper part of the sac, a small tumour, "à l'endroit répondant à l'anneau inguinal, une tumeur approchant du volume de la moitié d'une grosse noix ; elle disparoissoit lorsque la malade cessoit de crier, étoit de couleur grisâtre, et rentroit par une légère compression : on ne douta pas qu'elle ne fût formée par le péritoine poussé avec les intestins à travers l'anneau, dans les efforts et les contractions de cet enfant. Cette disposition donne l'explication d'un signe que présentait cette tumeur, et qui étoit des plus propres à jeter des doutes sur sa nature et à induire en erreur, favoriser son augmentation quand la malade toussait," etc.

of nephralgia calculosa, or nephritis ; by pain increased on motion : by the slow and gradual increase of the tumour, and other symptoms ; by the fluctuation of the matter, felt on alternate pressure being made on the loins, and upper and inner part of the thigh ; by examining the tumour in the alternate state of the erect and horizontal posture ; and by the absence of such symptoms as denote an obstruction in the bowels.

A crural hernia may be mistaken for an inguinal hernia.

From what has been already advanced, it is obvious, that the sex of the patient will assist us in distinguishing one kind of hernia from another ; women being so much more frequently afflicted with crural hernia than men.

The late Professor Hamilton, of Glasgow \*, seems to have thought, that one variety of hernia is very often mistaken by surgeons for another, and gives the subsequent catalogue of

\* Vid. Edinb. Phil. Transf. vol. 4th.

of symptoms, by which an inguinal hernia may be distinguished from a crural hernia.

“ The appearances of the bubonocoele, when small, will deceive a practitioner, if he is not on his guard, and make him imagine it a femoral rupture. The marks by which the one may be distinguished from the other, though situated in the same place, are few and simple.

“ As the fascia of the thigh joins Poupart’s ligament, the femoral hernia is always under the fascia ; it is therefore more compressed ; it is not loose ; and we cannot so well grasp it with the hand ; and, instead of being rounded on the top, it is more or less flattened.

“ The bubonocoele, again, is only under the skin and cellular membrane ; is therefore looser ; can be grasped ; and is rounded on the top.

“ In femoral hernia, the swelling begins at the edge of Poupart’s ligament, and goes down, and we feel the ring, and the parts above the ligament, uncovered by the hernia. In the

bubonocoele of women, it goes over Poupart's ligament, and sometimes up upon the muscles over the ring, and extends more to each side, along the bending of the thigh, than the other."

#### PROGNOSIS IN CASES OF CRURAL HERNIA.

THE prognosis, in cases of crural hernia, is much less favourable than in other varieties of hernia, as, in such cases, it is generally much more difficult to return the intestines into the cavity of the abdomen, than in the scrotal or umbilical hernia, on account of the narrowness of the neck of the sac, and from the sac in crural herniae being sometimes tilted upwards on the crural arch; thereby rendering the passage between the cavity of the herniary sac, and cavity of the abdomen, very indirect.

Besides, on account of the straitness of the passage through which the intestines are protruded,



truded, a very small part of the intestine only is commonly displaced, which is thereby in greater danger of being strangulated, than when the omentum also is contained within the herniary sac.

I shall conclude this paper, by making a few observations, which may be regarded as co-ralleries or inductions from the preceding facts.

As the neck of a crural hernia is generally much narrower than that of a bubonocoele, there is much greater risk of inflammation affecting the bowels contained within the herniary tumour in the former, than in the latter case; and there will be much greater difficulty, and therefore less chance of returning the bowels into the cavity of the abdomen, in a case of crural, than in a case of inguinal hernia.

In the case of a strangulated hernia, it is extremely difficult to name the moment when

the operation should be performed, and when it may prove a cure.

Dr Baillie very justly observes, that the pulse is by no means an infallible index of the state of the protruded intestine. “ The pulse is sometimes, in such a case, not increased in frequency beyond the standard of health, and yet the inflammation of the bowel has been discovered afterwards, by the operation, to be very great. This is an important practical observation, because it shows that the degree of inflammation is not to be judged of from the pulse, and teaches, that the operation should not be delayed, after the proper efforts for reducing the rupture have failed, because the pulse may happen to be little, or not at all, accelerated.”

Nor can we judge with certainty, from the state of the other symptoms, whether the operation will be the means of cure, as these are very various, in point of severity, in different constitutions.

In most cases, mortification of the bowels  
comes

comes on in one, two, or three days after the strangulation; but there are a few instances upon record, in which the operation has been performed with success after four, nay, after five or six days from the period of the strangulation.

In general, the difficulty and hazard of performing the operation for crural hernia deter the surgeon from having recourse to his operation in due season. In most instances, that important operation ought to be performed soon after the other means of reducing the herniary tumour have been found inefficacious, as the bowels, without much previous pain or inflammation, are often reduced to a state which proves fatal to the patient, by terminating in mortification.

From the annexed plates, we learn, that if the operation be postponed until a considerable degree of inflammation has affected the herniary sac, it will often be impracticable to reduce the bowels, as an effusion of coagulable lymph, which forms a bond of union between  
the

the herniary sac and bowels contained within it, very soon succeeds the inflammation; or, if the attack of the inflammation be violent, especially in crural hernia, it is very apt to terminate in mortification.

From the above description of the structure of the crural arch, and from the preceding account of the situation of the crural hernia, it appears, that Mr Gimbernat's mode of performing the operation for that complaint is not only the safest, but also the most certain method of taking off the stricture upon the bowels: Hence I shall subjoin his description of his mode of operating, and shall make a few comments upon it.

“ The patient being placed, as in the operation for inguinal hernia, and the hernial sac being laid open, an attempt should be made, if the intestine be uninjured, to replace it by the hand.

“ For this purpose introduce, along the internal side of the intestines, a canulated or  
grooved

grooved sound, with a blunt end, and a channel of sufficient depth.

“ This is to be directed obliquely inwards, till it enter the crural ring; which will be known by the increased resistance, as also when its point rests upon the branch of the os pubis. Then suspend the introduction, and keeping the sound (with your left hand, if you are operating on the right side) firmly resting upon the branch of the os pubis, so that its back shall be turned towards the intestine, and its canal to the symphysis pubis.

“ Introduce gently with your other hand, into the groove of the sound, a bistoury with a narrow blade and blunt end, till it enters the ring; its entry will be known, as before, by a little increase of resistance. Cautiously press the bistoury to the end of the canal, and, employing your two hands at once, carry both instruments close along the branch to the body of the pubis, drawing them out at the same time.

“ By



“ By this easy operation, you will divide the internal edge of the crural arch at its extremity, and, within four or five lines of its duplicature, the remainder continuing firmly attached by the inferior band, or pillar, of which it is the continuation.

“ This simple incision being thus made, without the smallest danger, the internal border of the arch, which forms the strangulation, will be considerably relaxed, and the parts will be reduced with the greatest ease.”

How far the advice given in the first paragraph of this extract, viz. laying open the sac, should be followed, admits of doubt.

My father, in his treatise upon the *burfae mucofae*, has published the histories of four cases, in which the bowels were returned into the cavity of the abdomen, without opening the sac, and, in all of these, the patients soon got well \*; and I know of another instance  
in

\* Vid. Appendix.

in which the same method of operating was adopted, and with the same good success. It seems singular that Mr Gimbernat should have recommended the opening the sac, before the tendinous substance is divided, as he seems, from a succeeding passage, to have been fully aware of the bad effect of exposing the intestines to the air: His words are, " This compress should extend two inches beyond the future, to prevent the introduction of the air, or of any body capable of occasioning irritation."

If the operation were performed as soon as it ought to be, after the other means of reducing the hernia have been found inefficacious, the contents of the hernial tumour generally may be reduced, without opening the sac.

Various arguments, which, at first sight, appear plausible, have been employed by those who recommend the laying open the hernial sac in all cases; but, if the reader will consult the Appendix to this paper, which contains

contains my father's arguments against this practice, he may probably be convinced, that the doing so, is not only unnecessary, but highly dangerous, except in very particular cases, where the neck of the sac is unusually constricted.

Mr Gimbernat affirms, that the bladder of urine, when distended by urine, or the uterus by its contents, may be injured in his mode of operating; but if the bladder be emptied, the smaller intestines will slip downwards into the place the distended bladder of urine pre-occupied, and hence may be injured.

I have subjoined an account of the mode of operating in cases of crural hernia, which has always been recommended and shown by my father, in his surgical lectures.

“ In the femoral hernia, the external incision is to be made obliquely, from within, outwards and downwards, beginning the incision an inch or so above the tendon called ligament  
ment

ment of Fallopius, and continuing it to the like distance below the ligament.

“ We are next to make a small hole, immediately below the ligament in the tendinous aponeurosis, which covers the muscles on the inner side of the thigh, and is connected to the ligament.

“ We are then to introduce the point of a small furrowed probe or directory under the ligament; and holding this in the oblique direction upwards, towards the umbilicus, we are cautiously and slowly to divide, with the straight probe pointed knife, one little bundle of the tendinous fibres after another, using the knife as a saw, instead of entering its point deep within the tendon, and then raising its handle, so as to make a large sweep or extensive incision with the edge of the knife.

“ I advise the edge of the knife to be turned towards the umbilicus; because, if it be turned inwards, towards the ring of the external oblique muscle, as Le Dran directs, it will very readily cut the spermatic chord, or round ligament

ment of the uterus; and, if it is turned outwards, as Mr Sharp advises, it may readily cut the epigastric artery; but when we turn it towards the umbilicus, it will be directed to the place at which the spermatic chord and epigastric artery cross each other, like the strokes of the letter x, and of course will be at the greatest possible distance from both.

“ If, besides giving the knife this direction, we slowly and cautiously divide the tendinous ligament, dilating the opening gradually by introducing the finger, I know, not only from the situation of parts in the sound body, but from a considerable number of cases, in which I have assisted in the operation, that the tendinous ligament may be completely divided without cutting the spermatic chord, or epigastric artery.”

Both methods of operating have been successfully performed: In the former, there is less risk of wounding the epigastric artery, in those instances in which there is the usual distribution of arteries; and it is evident, that  
that



that method of operating might be performed with still greater safety, if the surgeon, instead of carrying both instruments close along the branch of the body of the os pubis, and drawing them out at the same time, as Mr Gimbernat directs, divided one part after another with great caution. By following that method, he might even avoid dividing the obturator artery when it arises in common with the epigastric artery, and runs along the upper and inner side of the hernial sac; but as such is by no means a frequent *lusus naturae*, the operation of Gimbernat should not, on that account solely, be laid aside.

As an additional argument in favour of Mr Gimbernat's method of operating, I may add, that it is not essentially different from that recommended and practised by Mr Hey of Leeds.

Future experience must determine to which of these methods of performing the operation for crural hernia the preference is due:



## A P P E N D I X.

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### EXTRACT *from Dr MONRO's Description of all the Burſae Mucoſae of the human Body.*

WITH ſimilar views I have long ventured to propoſe a method of operating in hernia, which I am perſuaded, from a moſt ſucceſsful trial of it in different caſes, as well as from reaſon and analogy, would render this frequent and very neceſſary operation far leſs dangerous than it has hitherto proved in the hands of the moſt experienced and dexterous ſurgeons. And as this is a ſubject of the utmoſt importance, I ſhall ſtate it more fully than is perhaps neceſſary for illustrating the chief ſubject of this work.

That I may give a fair representation of the opinion and practice of the preſent moſt eminent ſurgeons, I ſhall quote the following paſſages from the works of one of the lateſt and moſt juſtly celebrated authors in ſurgery, I mean Mr Pott \*.

In the firſt place, he tells us (p. 286.) “ Theſe are my  
G “ principal

\* Pott's Works in 4to, 1775.

“ principal reasons for believing that the mere stricture  
 “ made by the tendon is, in the generality of incarcerated  
 “ ruptures, not only a sufficient, but the primary and in-  
 “ deed the sole cause of the symptoms, and of all the mis-  
 “ chief.”

When, after bleeding, glysters, &c. pressure, posture, and agitation of the patient's body are found to be insufficient for the reduction of the bowels, recourse is had to the operation; which is directed to be done in the following manner: “ An incision must be made through the skin  
 “ and membrana adiposa, beginning just above the place  
 “ where the intestine passes out from the belly, and  
 “ continuing it quite down to the lower part of the scro-  
 “ tum—The place to make the incision in the hernial sac  
 “ is about an inch and a half below the stricture, and the  
 “ opening need not be larger than to admit the end of the  
 “ operator's finger—With the knife on the finger the sac  
 “ must be divided quite up to the opening in the tendon,  
 “ and down to the bottom of the scrotum—The sac being  
 “ laid open, the intestine generally pushes out immediate-  
 “ ly—This is the time to try whether, by gently drawing  
 “ out a little more of the gut, its bulk cannot be so re-  
 “ duced, as to enable the surgeon to return it back into  
 “ the belly without dividing the tendon—Yet if it (the  
 “ reduction) cannot be very easily accomplished without  
 “ the division of the tendon, it had better not be attempt-  
 “ ed—The sac and stricture being divided, the contained  
 “ parts

“ parts come into view—In returning the intestine, care  
 “ should be taken to put in that part first which came out  
 “ last, &c. A considerable part of the hernial sac, if large,  
 “ thick, and hard, may very safely and properly be re-  
 “ moved—An old rupture which was originally congenial  
 “ is subject to a stricture made by the sac itself, indepen-  
 “ dent of the abdominal tendon, as well as to that made  
 “ by the said tendon. And in this kind of hernia I have  
 “ more frequently found adhesions of the parts with each  
 “ other, of the intestine with the testicle \*.” Stitching  
 up the wound is not directed to be done by Mr Pott; and  
 some late writers tell us it ought never to be attempted.

After observing the steps directed to be taken in the operation, let us consider the degree of danger which attends the operation, and the chief cause or causes of that danger; by which we shall be led to the way of avoiding them.

It is not only true that a great proportion, in general, of those on whom the operation for hernia has been performed, dies; but it must be acknowledged, that many die on whom the operation has been done early, before symptoms of violent inflammation bordering on mortification have appeared. Nay, Mr Sharp tells us, “ That he has  
 “ seen two or three patients, who were in every respect  
 “ hale and strong, and who submitted to the operation  
 “ merely to get rid of an inconvenience, die a few days

G ij

“ after

\* See Mr Pott's Works in 4to, 1775, pages 286, 278, 279, 280, 289; 290, 312.



“after the operation ;” and adds, “that the event, though very surprising, should be a lesson never to recommend this method of treating an epiplocele, unless it is attended with inflammation,” &c. \* The same thing has occurred to other eminent surgeons †: To which the reader will please to add what was before observed, that if wounds be made into the abdomen of sound animals, and that a portion of the alimentary canal, as large as that which is often contained in a herniary sac, be handled and exposed to the air, the animals frequently die.

That the wound of the tendon or peritonæum contributes little or nothing to the fatal event, appears clearly from the following circumstances.

In the first place, I might with great propriety quote the numerous experiments of Dr Haller and others, who have found that tendons may be wounded without pain or material bad consequences. But without dwelling on these experiments, I have in several cases directed the aponeurosis of the human temporal muscle to be cut largely in fractures of the cranium ; I have directed an incision to be made in the aponeurosis of the biceps flexor cubiti, for the discharge of fetid matter confined by it ; I have seen it repeatedly divided in the operation for aneurism ; I have in many living animals cut the linea alba and the peritonæum freely ; I have in two cases of bubonocoele cut free-

ly

\* See Sharp Op. of Surg. 1761, p. 28.

† J. L. Petit Tr. des Mal. Chir. 1774, T. 2. p. 354. &c.

ly the tendon of the ring of the external oblique ; and in two cases of crural hernia, divided with like freedom the tendon of the external oblique, called Ligament of Fallopius. In two of these cases, the peritonæum, which was thickened, and formed a stricture at the neck of the sac, was divided ; yet all these incisions were performed without producing any dangerous consequences. In like manner, I have seen the vaginal coat of the testicle laid open by incision ; but the dressings having slipped from between the lips of the incision, these grew together without producing such a degree of inflammation as seemed necessary to effectuate a cure, so that there was a necessity of tearing them asunder to introduce dressings and to admit the air.

We may therefore conclude, without a doubt, that the danger of the operation of hernia is not owing to the mere division of the tendon or of the peritonæum ; but that it depends chiefly, and almost solely, on the handling of the bowels, and the exposure of these and of the inner side of the sac to the air : Nay, in some cases where the operation of the hernia had proved fatal, I observed, in opening the abdomen, that portions of the intestine, and likewise of the peritonæum, at a distance from the herniary sac, were much inflamed, although the patient had not before the operation complained of pain, except at the place of the rupture.

When we now review the opinion and the practice of surgeons, we shall perhaps find they are not a little inconsistent with each other : for “ if the mere stricture made by

“ the tendon is, in the generality of incarcerated ruptures, not only a sufficient, but the primary and indeed the sole cause of the symptoms, and of all the mischief,” why, after the skin is divided, do surgeons first lay open the herniary sac its whole length, and then cut the tendon; instead of merely cutting the stricture made by the tendon, without opening the sac, and then reducing the bowels by pressure, posture, and agitation, if the latter should ever be necessary?

They pretend indeed to assign as reasons for their practice, that unless the sac is laid open, we cannot know in what state the bowels are; that the intestines or omentum are liable to mortification; that collections of fetid water are apt to occur, which, on being pushed back into the abdomen, might be productive of mischief; that sometimes the cause of strangulation has been detected either in the entrance to the sac or among the bowels protruded; or they tell us there are adhesions of the bowels to the inner side of the sac, which ought to be separated.

But such kind of reasoning, if it has weight, goes farther than is intended; for it ought to prevent surgeons from attempting in any case, at least from attempting in most cases, the reduction of a hernia.

Yet nothing is more common than to see surgeons doing every thing in their power to reduce a hernia; and in a few minutes or hours thereafter, instead of taking off the stricture by cutting the tendon, laying open the herniary sac, as if the reduction of the bowels would otherwise have

been unsafe. Surely no reason can be given why the reduction of the bowels should be safe before the tendon is cut, but unsafe after it is cut.

But instead of using this kind of *argumentum ad hominem*, as it is called, I would observe farther, that it so very seldom happens that one part of the intestine is twisted around another, or the omentum around the intestine, so as to strangulate it, that we find only a very few such cases mentioned in the whole history of surgery. And if even we were to suppose such a case of twisting or volvulus, if the hernia had not continued so long as to produce an accretion of the bowels, the effect of the twisting and pressure would probably be taken off by pushing the bowels back into their natural place in the large cavity of the abdomen. As for the fetid water, which it is said is apt to occur, and that the pushing it back into the abdomen might be productive of mischief; from what I have observed in the operation of hernia, I am very doubtful whether fetid water is ever produced except where there is mortification. Water is indeed often effused in a strangulated hernia; but if there is no mortification, and the hernia be reduced, that water produces no bad symptom, but is soon absorbed. If this was not the case, the reduction of every hernia which had been for a short time strangulated would be attended with danger.

We are by this observation led to consider the treatment in mortification.

If it be certain that the bowels are mortified, the necessity of opening the sac is evident, that we may give our patient a chance of life, though to be attended with most uncomfortable circumstances : But if there be the smallest chance that the inflammation may terminate without mortification, it is equally certain that nothing can be so pernicious as opening the sac, and that the bowels ought to be returned without exposing them to the air.

To make this more evident, I shall suppose that the bowels cannot be reduced by taxis, or that the operation is necessary in two hundred patients ; and that in one fourth part of the number, the bowels are so much strangulated and inflamed, that the termination in a mortification could not by any means be prevented, but that in the other three fourths there is a probable chance that the inflammation may be dispersed.

If the operation be done in all these cases by opening the sac, it is probable that of the first fifty we may save one or two in all ; and of the other hundred and fifty, thirty or forty at the utmost. Whereas, if we suppose that in all these patients the skin and tendon only are divided, and the bowels reduced without opening the sac, we should indeed lose all those in whom the mortification was complete : but I am well convinced we should not lose above ten or twenty at most of the other hundred and fifty ; and that upon the whole many more lives would be saved.

After



After having reasoned in this manner upon the subject for several years, I determined to put this method of operating to the trial, and have accordingly directed it to be practised in four cases: in all of which the patient seemed to be in great danger, and yet every one of them recovered, without a single bad symptom in consequence of the operation.

In 1770 I was called, along with Mr Alexander Wood, to a case of crural hernia in a woman thirty-five years of age, with symptoms of strangulation, which had continued three days. Finding it impossible to reduce it, I prevailed with Mr Wood to cut the tendon, without opening the sac, and then to attempt the reduction; which we executed with the utmost ease.

In 1774, in a case of hernia congenita, to which I was called by Mr Clarkson, surgeon at Dalkeith, we found the neck of the sac, as well as the tendon of the oblique muscle, extremely constricted. After cutting the skin and tendon, we, with much difficulty, divided the stricture at the neck of the sac; and, having reduced the bowels, we stitched the teguments.

In the end of 1781, I was called by Mr Arrot, surgeon in Edinburgh, to a gentleman considerably above sixty years of age, who had been long subject to a large hernia, which had been strangulated for several days. All the common means of cure having proved ineffectual, I proposed

posed the incision of the tendon, which was very easily executed; and, after that, all the bowels were readily returned into the abdomen, except a portion which seemed to grow firmly to the inner side of the sac. All the bad symptoms disappeared; and the incision, the sides of which were supported by stitches, closed like a common wound of the teguments.

In 1782, I was called by Mr Simpson and Mr Calderwood, surgeons in Dalkeith, to a case of crural hernia, which had been strangulated more than two days, in a woman thirty-five years of age. I directed the tendon to be cut; but still finding resistance from a straitness and thickening of the neck of the sac, we made a small perforation in the peritonæum above the stricture, and introducing a probe bent semicircularly at its point, cut the neck of the sac upon it. We then easily reduced a small portion of the ileum which was strangulated, and stitched the wound accurately. Six days thereafter, I received from Mr Calderwood the following letter.

“ Sir,

“ I have the pleasure to inform you, that our patient at Dalhousie promises a favourable recovery. She has had regular and free passage twice a-day. The pain in her belly is quite gone. She has had hardly any degree of fever, and the wound discharges good matter. I am  
convinced

convinced the stitching, beside lessening the danger, will contribute very much to a speedy recovery.

I am, &c.

R. CALDERWOOD."

*Dalkeith, Nov. 8. 1782.*

This patient, and, so far as I know, all the others, are still alive and well.

We are told, in the last place, that the sac ought to be laid open, in order that the surgeon may separate any adhesions the bowels may have contracted.

For my own part, I am much inclined to believe, that, in the case of adhesion, the safest and best general rule will be, to take off the stricture by cutting the tendon, without exposing the patient to the imminent danger of opening the sac, to be heightened by the time which must be necessary for the separation of the adhesions.

But if, instead of this, the reader shall, upon the authority of Mr Pott, judge it adviseable in all cases to attempt the separation of adhering parts \*, it will surely be time enough to open the sac, after we have taken off the stricture by cutting the tendon, and found that the bowels cannot be reduced by pressure, because they adhere to the inner side of the sac.

The

\* Mr Pott, p. 291. says, "I have seen the intestines very firmly adherent to each other, to the sac, to the omentum, and to the testicle; but never in such a state of adhesion as to be incapable of being returned."

The rule of opening the sac, after dividing the skin, seems to have been introduced, because surgeons supposed the mere incision of the tendinous parts constituted a principal part of the danger of the operation; and that they were by no means aware that the danger proceeded chiefly and almost entirely from the exposure of the bowels to the air: And this practice has of late been transmitted from one author to another, from a want of due attention and reflection \*.

Upon

\* The ingenious M. J. L. Petit proposed, many years ago, to avoid opening the sac in the operation for certain cases in strangulated hernia, as appears by a posthumous work of his, printed at Paris in 1774, in three volumes, *De Malad. Chirurg.* It has been reported that he afterwards relinquished this method, and “joined keenly with those who had opposed it;” but I find no proof of this in his posthumous work. But if we attend to his reasoning upon it in tom. ii. p. 356, where he lays down the following proposition, which not only appears at first sight paradoxical, but which cannot be founded on proper facts, and leads him, in p. 359, to a most dangerous and false conclusion, “*Qu’il est bon, pour reussir, que les parties aient été quelque tems à la gene,*” to wit, “*Que ces operations faites aux hernies sans étranglement, n’ont pas des suites si heureuses, que celles, qui sont faites aux hernies qui sont étranglées;*” we will readily perceive, that Mr Petit did not perceive the chief advantages of the operation he proposed; I mean, that the danger in the common method of operating arises chiefly from the exposure of the bowels to the air; and as this material fact has been little better understood by various authors who have lately wrote on the subject, that method has been rejected by them on as slight foundation as that on which it was proposed by Mr Petit.

Upon the whole, I have no doubt that many lives may be saved by adopting the following rules in the operation for hernia.

If the surgeon is not called till the bowels are evidently in a state of mortification, the method recommended by authors is to be followed.

But if he is called in proper time, after trying in vain the ordinary method of reducing the bowels, he ought to operate more early than is commonly done, or before the inflammation can have produced adhesion; in which case the operation, after dividing the skin, should consist merely in the taking off the stricture by cutting the tendon. In this case, after the skin opposite to the ring is cut, the stricture is to be taken off by dividing the tendon; after which the bowels may, by gentle pressure, be returned into the abdomen, without any danger of their suffering by being twisted; and the inflammation which follows the division of the tendon, especially if the sides of the incision in the skin be joined by stitches, will scarcely be greater than where the skin alone is divided.

By the by, I would here observe, that the division of the tendon in the crural hernia is not attended with that degree of danger which some of the latest and most eminent writers have supposed \*, providing the edge of the knife be turned towards the umbilicus; in which direction, both the epigastric artery and spermatic cord are at  
the

\* Pott, p. 308.



the greatest distance from it ; and that the knife be used like a saw, dividing cautiously with it one tendinous fasciculus after another.

If, after dividing the tendon, the bowels cannot easily be returned into the abdomen, there may be room for suspecting that they are confined by a stricture of the neck of the sac, especially in the hernia congenita ; which must therefore be in the next place removed.

If the herniary sac under the straitened place of its neck be thin and transparent, and that there is little or no reason to suspect an adhesion of the bowels with the sac, the best method will be to make a small hole in the sac below the stricture, and then to introduce a small furrowed probe, and to cut cautiously upon it : But if the sac be thick and dark coloured, and that there is likewise a suspicion that the bowels may adhere to it, the easiest and safest manner will be to make the hole in the peritonæum above the stricture ; then to introduce a common probe, bent near its point into a semicircle ; and to introduce this, with its point directed downwards, through the stricture into the sac ; and, upon the point of it, to make, with great caution, another small hole ; after which we may either cut upon the probe, or introduce a furrowed probe, and divide the neck of the sac \*.

After

\* In a case of crural hernia to which I was called along with Mr Dewar surgeon, in 1772, the sac was thick and opaque, with

After this the bowels are to be returned by pressure upon the sac, without opening it farther ; and the wound in the skin is to be stitched so accurately, by passing the stitches about the breadth of the finger from each other, as to prevent the access of the air. The wound in the skin ought likewise to be dressed with large pieces of lint spread with simple cerate, and these should be covered with a compress.

In the hernia congenita, where the bowels are in the same sac with the testicle, it is still more necessary than in the most common kind of hernia to avoid opening the herniary sac, as the inflammation of the testicle would add considerably to the danger.

In the case of hernia congenita, which I treated along with Mr Clarkson in 1774, the testicle, which, before the operation, had been in a great measure concealed by the bowels descending to the bottom of the scrotum, was not so much inflamed during the cure as to be sensibly enlarged.

Before I conclude, I cannot help taking notice of a want of accuracy, in the late writers, as to the manner of distinguishing the hernia congenita. Mr Pott, p. 311, says,

“ The

with a suspicion of adhesion; for which I proposed this method; and we executed it with little difficulty. It was likewise easily done in the operation I attended in 1782 with Mr Simpson and Mr Calderwood, and very lately in a case I attended with Dr Alexander Hamilton and Mr Andrew Wood surgeon.

“ The appearance of a hernia, in very early infancy, will always make it probable, that it is of this kind ; but, in an adult, there is no reason for supposing his rupture to be of this sort, but his having been afflicted with it from his infancy. There is no external mark or character, whereby it can be certainly distinguished from one contained in a common hernial sac ; neither would it be of any material use in practice, if there was.”

Instead of which, I would observe, 1. That a hernia that is not congenite may have continued from early infancy. 2. That a congenite hernia may be distinguished in an adult by an evident external mark ; which is, that the bowels push down between the sac and the fore part and sides of the testicle, so as often, in a great measure, to conceal it ; whereas, in the common hernia, every part of the testicle can be felt distinctly. 3. I would allege, that it is of material use to make the distinction ; because, in whatever manner we operate in the hernia congenita, unless we take the utmost care to exclude the air, there will be a more violent inflammation and greater distress than in common cases, because the testicle will partake of the inflammation.

## DESCRIPTION

# EXPLANATION

OF THE

## T A B L E S.

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### TAB. I. FIG. I.

REPRESENTS a large praeternatural aperture in the mesentery of a woman, through which a considerable portion of the intestinum ileum had passed and been strangulated. The patient had the usual symptoms of inflammation of the bowels before her death.

The plate represents the bowels as distended by air; the mesentery is seen somewhat like a cord; and the intestines passing through the praeternatural aperture in it.

1. 2. 3. 4. 5. 6. 7. 8. 9. point out the successive turns of the intestines. This plate is half the size of nature.

### FIG. II.

Represents an inside view of the pelvis of a boy who had laboured under scrotal hernia. The plate is of the same size as nature.

A, the rectus abdominis turned forwards.

B, the bladder of urine.

C, the rectum.

DD, part of the os sacrum, covered by membrane.

E, the external iliac artery.

F, the external iliac vein.

G, the epigastric artery, sent off from the external iliac artery; is seen passing behind the spermatic cord and vas deferens, and then along the inner side of the neck of herniary sac H, to the rectus abdominis A.

IJ, a fore shortened view of the under part of the herniary sac and testicle.

K, the beginning of the circumflex artery.

M, the spermatic cord, with its artery and vein injected, passing over the epigastric artery, and then behind the herniary sac.

N, the vas deferens passing behind the herniary sac; crossing the epigastric artery G; and then going backwards between the rectum and bladder of urine.

O, the umbilical artery.



## TAB. II. FIG. I.

Represents a portion of the ileum, part of which had been strangulated within a herniary sac.

The marks of the stricture are seen at AA.

The portion of intestine below the stricture was of a deep purple colour, and the surface of it was covered by a very thin layer of coagulable lymph.

B, a portion of the mesentery.

## FIG. II.

Represents a singular instance of plurality of sacs: in this instance there were four herniary sacs. The largest, A, was filled with bloody water. A part of this herniary sac was removed to show two smaller sacs, B and C, within it: these seemed to be separated from each other by the septum D, which is very thin posteriorly.

E, a small sac at the side of the largest sac A.

The sacs A and E communicate laterally at L; as may be seen by the light coming through the opening.

B and C do not communicate.

The sac B communicates with the sac A, by a small rounded opening in the posterior part, which cannot be represented in this view of the parts.

Condensed cellular substance and fat surround the herniary sacs.

GK, the femoral artery, and its great branch, arteria profunda.

M, the femoral vein.

### FIG. III.

Represents an inside view of the same preparation.

A portion of the abdominal muscles covered by the peritoneum A.

B and C, two passages through the abdominal muscles.

The smaller aperture does not communicate with any of the sacs, and does not go very far.

B, the larger aperture communicates only with the sac C.

EE, the external iliac artery vein.

The figures in this plate represent the parts of their natural size.

## T A B. III. F I G. I.

Gives an inside view of the left side of the pelvis of a woman.

The reader is supposed to be looking obliquely down towards the fore part of the pelvis.

The peritoneum is removed, in order to show the parts which were obscurely seen through it.

A, the round ligament of the uterus passing in a canal; the posterior part of which is strengthened by the under portion of the internal edge of the crural arch.

b, c, d, point out the inner side of Poupart's ligament, or the internal edge of the crural arch: c and d represent the portion divided by Gimbernat in his operation for crural hernia.

CDN, the tendinous aponeurosis covering the internal iliac muscle, consisting of fibres running longitudinally; others pass transversely; it is interwoven with the crural arch in such a manner, as is seen at A, that herniae cannot happen between the external iliac artery and the ileum, or between b and C.

From the tendinous aponeurosis covering the iliac muscle, a membrane passes behind the external iliac artery K, and its corresponding vein L. This membrane is inserted into the edge of the pectineus muscle, and is attached to the pubis, where it is united with the duplicature of the arch pointed out by the letters c, d, which terminates

in the same spine of the pubis : a ligament is thus formed, below which the pectineus muscle is inserted.

From the crural arch, there arises an aponeurotic sheath : this is the inner side of the uppermost part of the origin of the fascia lata of the thigh : this forms the anterior part of the sheath, which encloses part of the external iliac blood-vessels.

The iliac blood-vessels K and L, and a few lymphatic glands, enter into this sheath.

One of the crural nerves is seen passing on the outer side of the external iliac artery K.

The epigastric artery G is sent off from the external iliac artery K, before it enters the sheath ; and, with its corresponding vein, passes obliquely inwards, on the inner side of the round ligament of the uterus A. The obturator artery is seen passing inwards to the foramen obturatorium : in this instance, it arises from the same part of the external iliac artery, as the epigastric artery.

The circumflex artery E passes outwards.

X, an aperture on the inner side of the external iliac vein L, which is, in some subjects, filled up by a small lymphatic gland ; through this the bowels protrude, and form a crural hernia.

The external iliac blood-vessels K and L fill up the principal part of the orifice of the sheath : the round ligament of the uterus A shuts up a little of the external side of it.

The epigastric artery and vein cover its anterior and internal part, on their way to the rectus muscle of the abdomen.

RRR, part of the external oblique muscle, and rectus muscle of the abdomen.

The parts represented in this table are reduced to two thirds of their natural diameter.

## FIG. II.

Represents a sac of a crural hernia.

It adhered to the neighbouring fat and cellular substance: hence it appears considerably thicker in some places than others.

A, its narrow neck.

B, the cavity of the sac perfectly smooth when it was first opened; but is now a little corrugated, from having been preserved for a long time in spirits.

This figure is of the natural size.





## PLATE IV. FIG. I.

Gives an inside view of the right side of the pelvis of a woman, who died in consequence of crural hernia. The abdominal muscles AA were turned forwards.

B, the under part of the rectus abdominis.

CC, A part of the iliacus internus muscle.

D, a part of the psoas muscle.

E, the external iliac artery.

In this case, there was a *lusus naturae* with respect to the origin of the obturator artery.

F, a trunk common to the obturator and epigastric arteries.

G, the obturator artery passing behind and on the outer side of the neck of herniary sac, to pass through the foramen obturatorium I.

K, the epigastric artery passing on the outer side of the herniary sac, and crossing the round ligament of the uterus L, on its inner side.

M, the circumflex artery passing outwards, and towards the os ileum.

N, a small nerve, derived from the lumbar nerves, passing along the iliacus internus muscle.

In this instance, the parts are nearly of their natural size.

## FIG. II.

Gives an inside view of the left side of the pelvis of the male.

The parts in the plate are represented of their natural size.

AAA, point out the abdominal muscles turned forwards and downwards.

B, a portion of the iliacus internus muscle.

C, a portion of the psoas magnus muscle.

D, the external iliac artery.

E, the circumflex artery.

F, the epigastric artery.

G, the external iliac vein.

H, the epigastric vein.

I, the spermatic cord.

G, vas deferens.

KKK, nerves from the lumbar plexus.

LMN, the internal edge of the crural arch.

That part, marked N, is much broader than in the female pelvis.

The aperture X on the internal side of the external iliac vein is of a different shape and size from that of the female pelvis.

O, the crest of the pubis.

## T A B. V. FIG. I.

Represents a front view of the relative situation of the crural herniary tumour with respect to the neighbouring blood-vessels and nerves, on the right side of the body.

The parts are represented of their natural size : it was taken from the same woman as fig. 1st of plate 4th.

A, the herniary tumour.

B, the neck of the tumour.

C, the femoral artery. The anterior crural nerves are seen on the outer side of the artery.

D, femoral vein.

E, the vena saphena.

A portion of the abdominal muscles was cut out, in order to show the true situation and course of the epigastric artery G.

H, round ligament of the uterus crossing the epigastric artery.

I, the under part of the rectus abdominis.

K, tendinous membrane turned back, which covered the rectus abdominis.

MNO, the under part of the tendon of the oblique muscle, called crural arch.

## FIG. II.

Represents a fore view of a portion of the ileum contained within a herniary sac of a crural hernia.

The sac A adhered to the neighbouring fat; and therefore appears uneven on its surface, and much thicker in some places than in others.

The neck of the sac was narrower than any other portion of it. The engraving represents the sac after it was opened; in consequence of which, the opposite sides of it have receded to a considerable distance from each other.

The protruded portion of intestine was fixed to the bottom of the herniary sac AA, by means of a layer of coagulable lymph F.

The protruded portion of intestine had dragged down along with it a portion of the mesentery B.

The cavity of the protruded portion of intestine was nearly filled by coagulable lymph, except at that part of it represented by the letter C.

At the letter E, there was so complete an obstruction, that not even a small probe could be passed from the upper to the under part of the strangulated intestine.

F, a layer of coagulable lymph uniting the protruded portion of bowel to the herniary sac.

GG point out the appearance of the intestine on each side of the protruded portion of intestine.



## T A B. VI.

Gives a view of the situation and size of a crural hernia on the left side of the body of a woman.

A portion of the abdominal muscles was cut out, in order to show the relative situation of the epigastric artery, and vein, and round ligament of the uterus, with respect to the tumour.

A, the abdominal muscles.

BBB, point out the portion of abdominal muscles which was cut out.

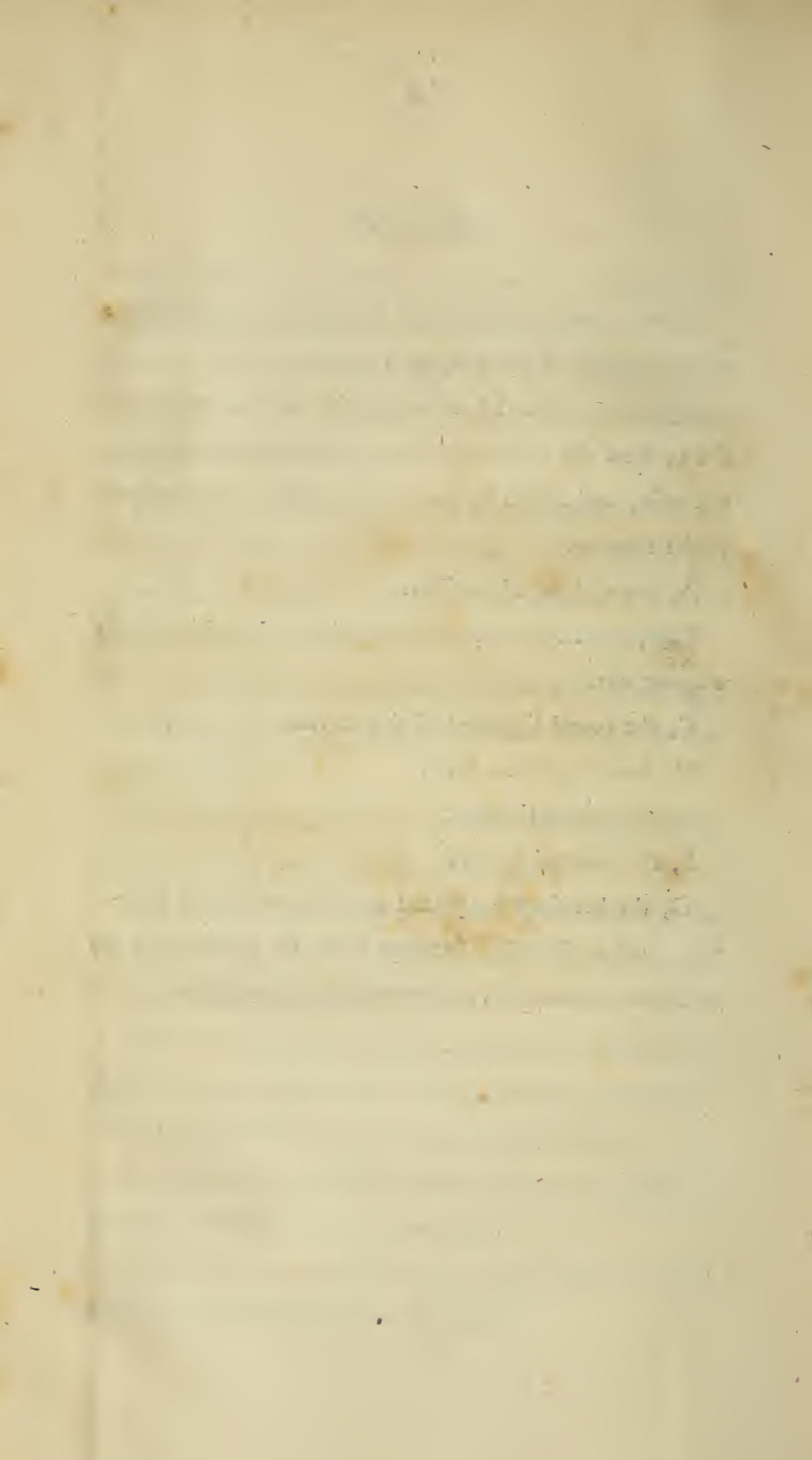
C, the round ligament of the uterus.

D, the epigastric artery.

E, the epigastric vein.

F, the femoral artery.

G, the herniary sac placed on the inner side of the artery, and considerably flattened from the pressure of the tendinous aponeurosis of the muscles of the thigh.



## P L A T E   V I I .

Shows an example of what may be called internal hernia. In this instance, a processus caecus, denoted by the letters AB, passed around, and strangulated a portion of intestine, marked by the letters DDD.

The patient died of ileus.

The ligament C unites this unusual process to the mesentery.



## ADDENDA.

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By mistake, a variety of internal hernia (which is probably more frequent than any other) was not mentioned in its proper place; viz. That in which the bowels enter into the upper aperture, but do not pass out at the lower and external aperture of the ring of the abdominal muscles.

I had occasion lately to see an instance, in which there were two obturator veins on the same side. One of these accompanied the obturator artery, which arose from the external iliac artery, and terminated in the external iliac vein. The other obturator vein terminated in the hypogastric vein.





Fig 2<sup>nd</sup>

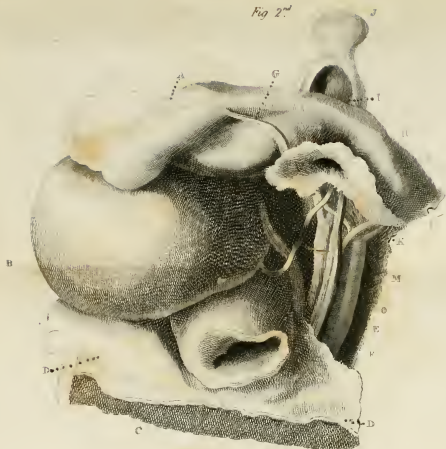


Fig 1<sup>st</sup>

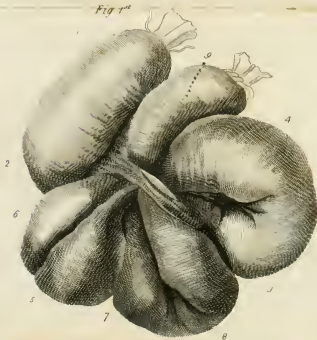




Fig 1



Fig 2.



Fig 3

A







Fig 1<sup>st</sup>

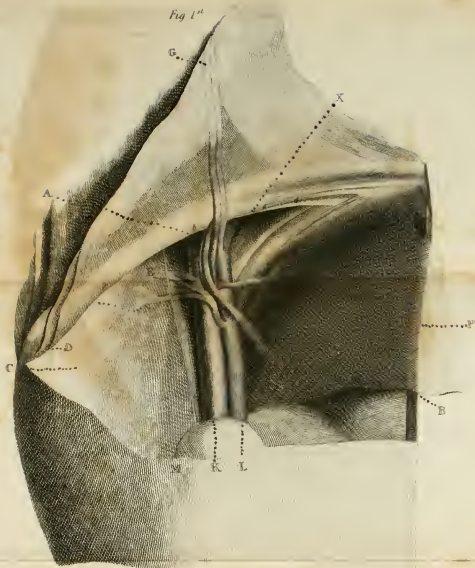
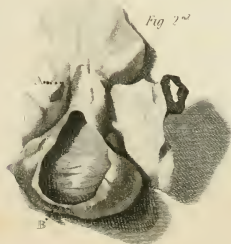
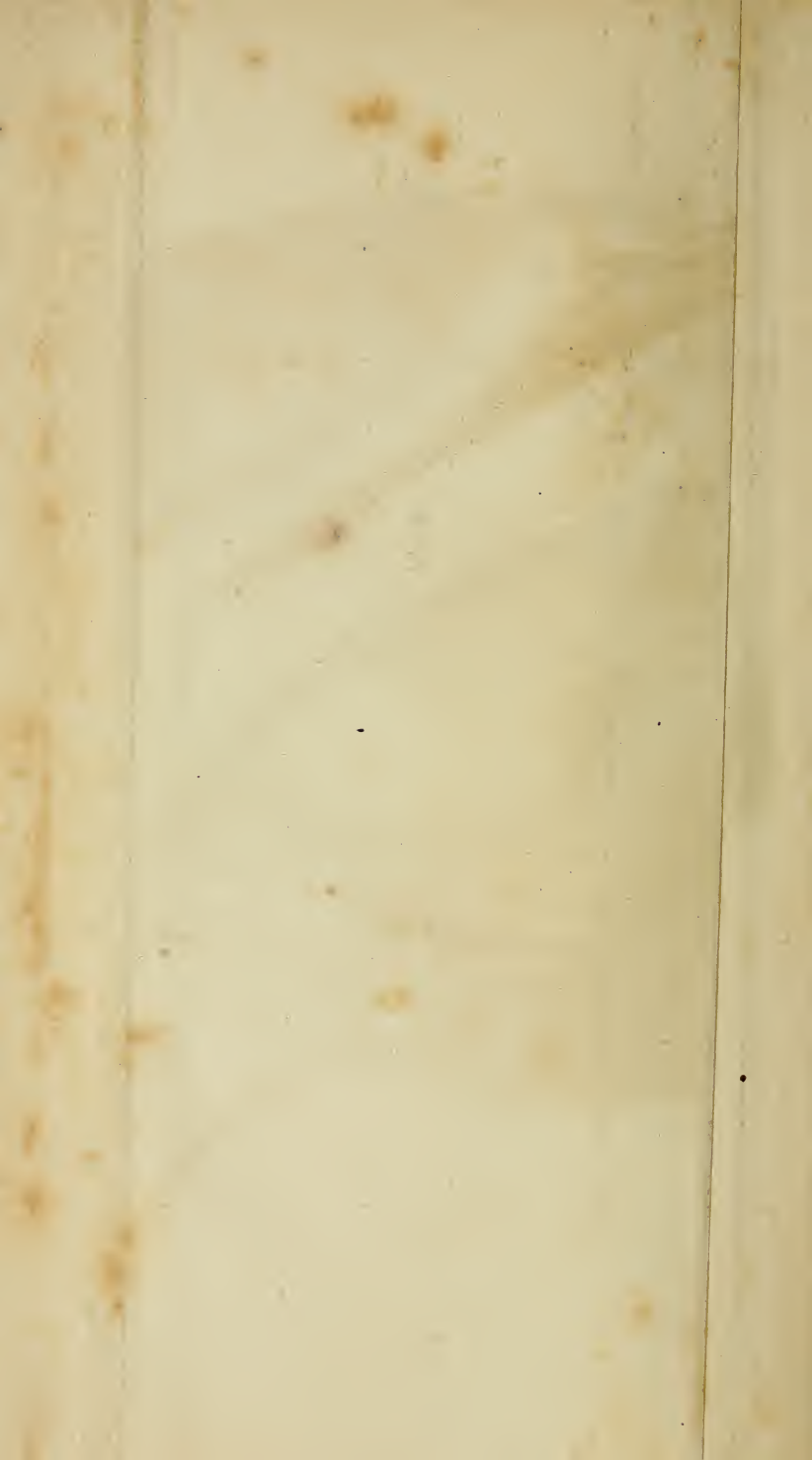


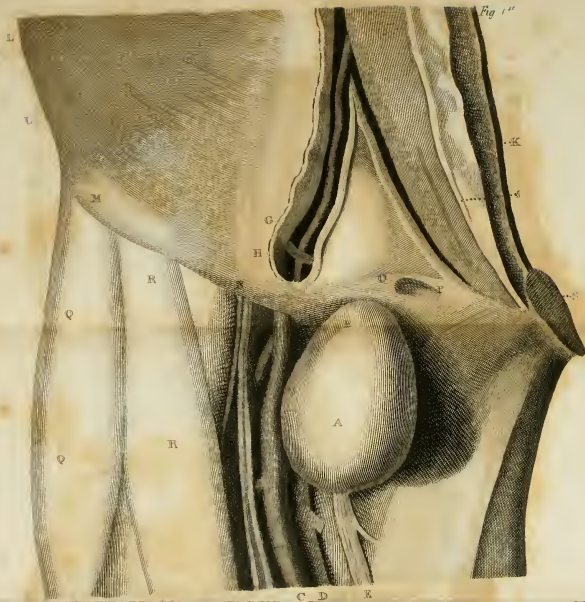
Fig 2<sup>nd</sup>



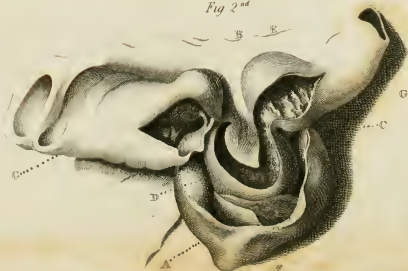








*Fig 2<sup>nd</sup>*





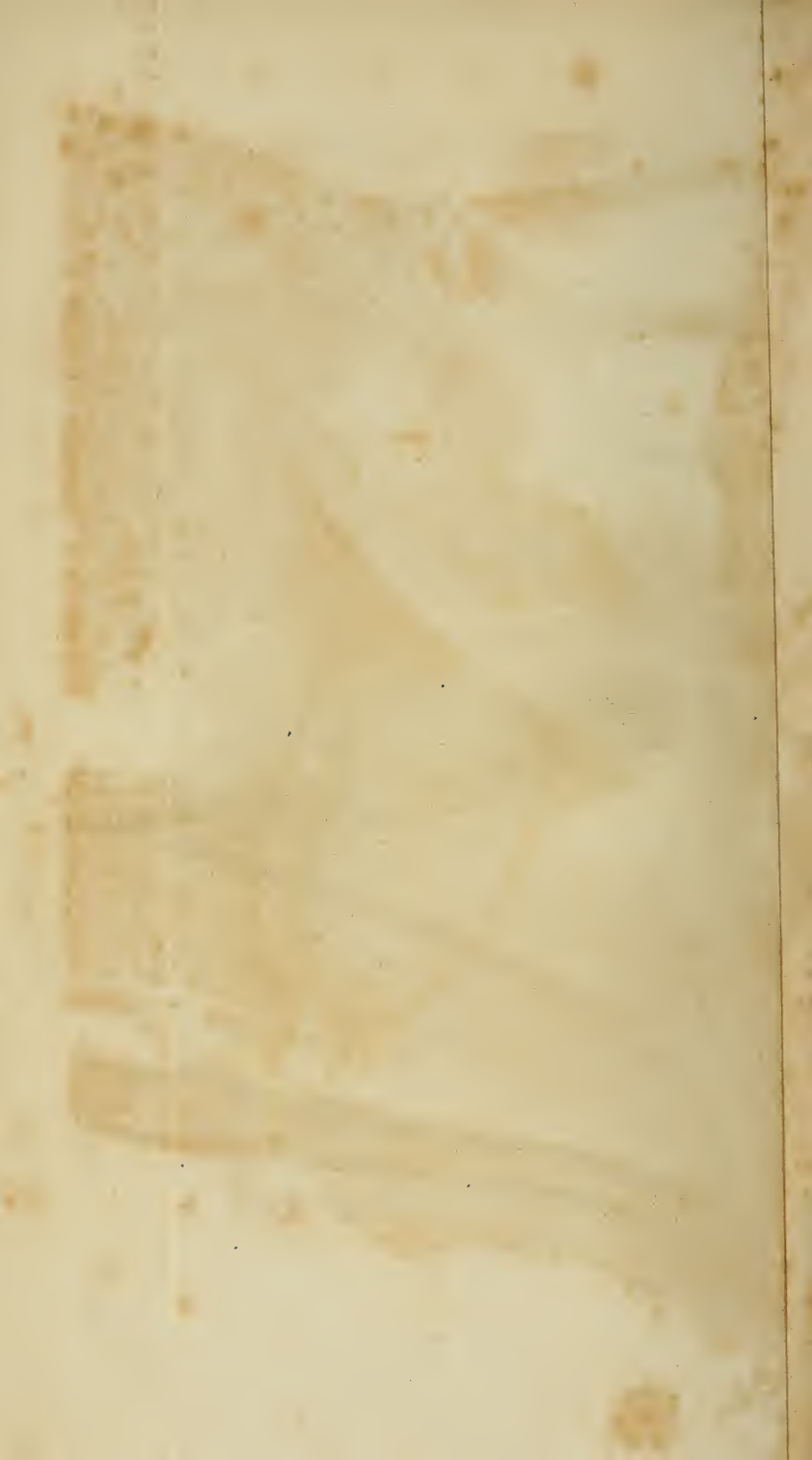
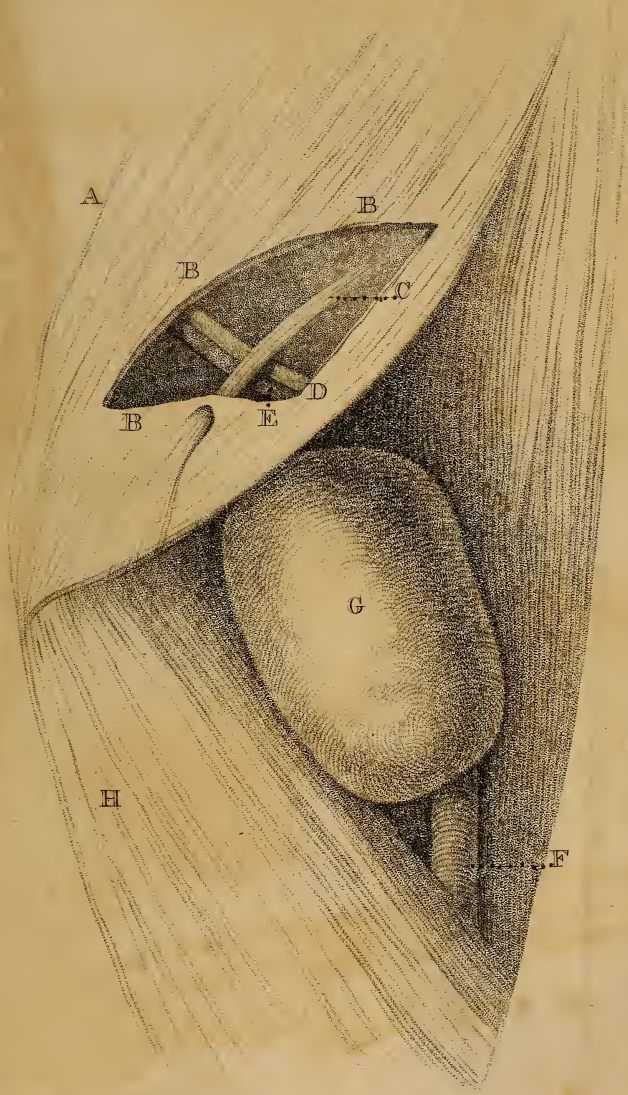


Plate VI.



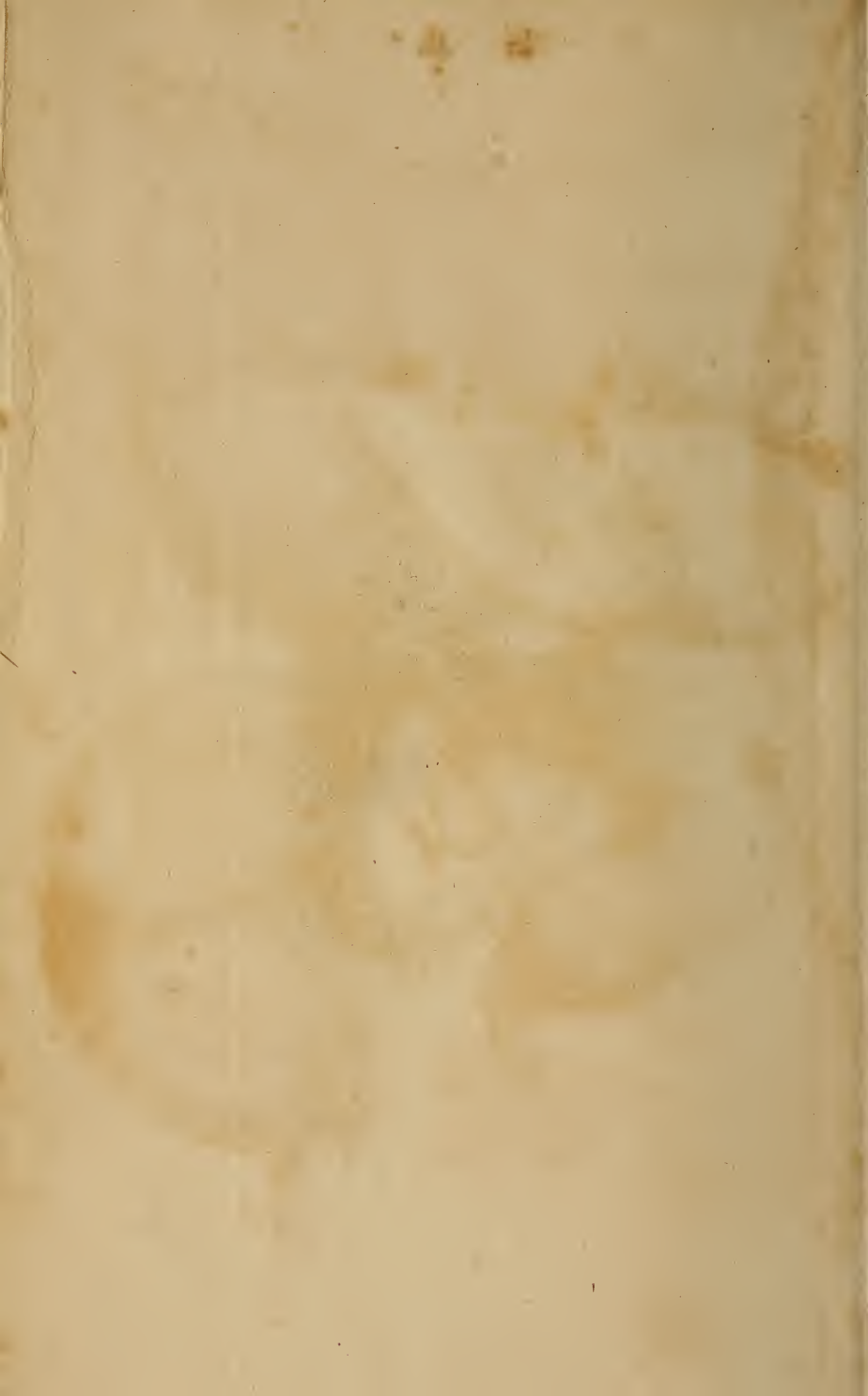


Plate VII.

